



Computer Weekly

Thursday, September 22, 1983

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HP gets into the personal fray

by Philip Hunter
HEWLETT-PACKARD this week launched a 16-bit IBM compatible micro and a worldwide marketing campaign to attack the business personal computer market.

The move strengthens the company's armoury in the battle for small business system users, following the launch in July of three minis to replace the HP 3000 Series.

The new HP150 has a touch sensitive screen, and offers the MS-DOS operating system, but not the popular CP/M system. UK retail price will be £2,900 for a version with dual 31/2-in Sony floppy disc drives, and £4,650 for a 15 Mbyte hard disc version, making it comparable with other popular models, notably the IBM PC and the Sirius.

John Golding, head of European marketing of personal computers, claims that the pricing of the new machine ends the company's reputation for offering quality only at great expense.

"We are aiming for 10% to 15% of the business PC market," says Golding. This market will be worth about \$10 billion in 1984, according to some estimates.

The company will start a big promotional push at UK dealers, software houses and users in 1984, and has already embarked on a \$7



GOLDING... "We are aiming at 10-15% of the market."

million television advertising campaign in the US.

Next month, the company will open a new customer support centre in Reading, offering a free phone-in consultancy to all users of the HP150. Software for the green phosphor screen will have to be specially adapted, and the company will issue instructions to third party software houses which, contrary to previous company practice, will be actively encouraged to provide packages for the new machine.

The company has its own high level operating system called Personal Application Manager to shield the user from the complexities of MS-DOS. "It is possible for the user not to realise that MS-DOS is the operating system," Golding claims.

The HP150 has a 9in screen, but Golding claims that the sharp definition of the display will compensate for its size.

European versions of the HP150 will be built at Grenoble in France, and Golding says that each country will have its own version of the machine.

GEC converges on commercial market

by John Kavanagh
GEC is setting its sights on the commercial computing market in a big way for the first time.

The UK industrial giant's move follows the signing of a deal with US microcomputer manufacturer Convergent Technologies and a decision to standardise on the Unix operating system following tests.

But the move is still 18 months off and will depend partly on the company's success with the Convergent Technologies 16-bit machine.

The US microcomputer fills a gap at the bottom of GEC's 4000 minicomputer range. It runs Unix and GEC is now completing live tests of Unix on the 4000 at some customer sites.

"Our existing scientific and engineering users are asking for equipment such as the Convergent Technologies machine, because they want to move timesharing applications to stand-alone micros," explained Chris Ellis, the marketing director of GEC Information Systems.

"First we will satisfy the needs of these, our traditional, customers."

"Some will add the micros to their GEC networks."

"But our ambitions don't stop there. We're not really big in commercial computing - but that will change."

"We'll start by aiming at programmers, who will be attracted

by the Convergent Technologies machine.

"After 18 months of this the potential of the commercial market will be much clearer," declared Ellis.

And he added: "I think the potential will be such that the only constraint will be the rate at which Convergent Technologies can supply the machine."

Ellis said GEC was examining Unix application packages. There would be compatibility from the Convergent Technologies machine up to the range of 32-bit GEC computers.

GEC Information Systems will sell the microcomputer directly to users through its own sales force and through its office automation subsidiary A.B. Dick.

The new 16-bit machine will be sold in the UK, Europe and the US.

Links to GEC's SL-1 digital private telephone exchange and to the teletex super telex service will be provided.

If GEC's plans come to fruition this will be the company's 4th positive push into the commercial market.

In the past the company has concentrated on scientific and engineering users.

Two months ago it was on the verge of moving into the business microcomputer market with a £3.25 million takeover of UK firm Topcon but that deal fell through a month later.

BT rejects IBM billing and gives ICL a chance

by John Kavanagh
BRITISH Telecom has rejected a US package, based on IBM hardware, which could have been a quick answer to its need for a new customer billing system.

The corporation has gone back to the drawing board to develop its own system, giving ICL a chance to win a plum contract, which could involve orders from the 61 telephone areas.

BT had been evaluating the system from US telephone firm Cincinnati-Bell since March. "We felt that taking an established system would be a quick way to get going," BT said. "But the US company's working practices and the way it is managed are very different from ours and we would have to put a lot of time and effort into adapting it."

"Given the technology that is available we can develop our own system fairly quickly. A tailor-made system is bound to be better."

BT wants a new billing system partly because the 61 areas are being given more autonomy and becoming profit centres, so its central billing system is no longer appropriate. In addition it is a batch system and more than 15 years old. It produces bills but little in the way of management reports. It runs on ICL mainframes.

BT also wants a modern system because of the possibility of competition as its monopoly is watered down.

The new billing system will give customers the option of having details of every call printed on the bill. It will also hold details of customer's communications, with fault history, changes and so on. The Cincinnati-Bell package would have had this second part of the system.

BT said it was now at the system development stage but had not decided which option to use. ICL was a possibility, but it was not clear if it was probably ICL's biggest system. Meanwhile BT is in systems from IBM, GEC and others, before choosing the system that will handle the bulk of calls for the billing system.

The billing project has been tackled from various quarters. The National Civil Liberties has pointed out the possibility of government monitoring calls.

Osborne may go on in the UK

by Howard Karten
OSBORNE Computer Corporation, which filed for bankruptcy under Chapter 11 of US law last week, has up to eight weeks in which to raise enough cash to carry on.

There is virtually no chance it will take back the 1,000 manufacturing staff who have been laid off. But the company could re-emerge as an exporter of kits from the US for assembly in other parts of the world. At present all manufacturing at the Hayward, California, plant has ceased and only 70 employees are retained.

But UK managing director Mike Healy was optimistic that the British side of the business would continue, whatever the outcome of the attempt to resume the American operation from collapse.

He said he had been approached by a number of sources wishing to put money into the UK distribution, to sell both existing and new computer products.

Last Friday the Californian bankruptcy court allowed Osborne protection from its creditors in the short term, by letting the banks give it credit.

Software survey shock

Continued from front page
Six, while salaries rise only 3% per year, the package has been cut by 30% per year.

Many outfits can now get teams of Cobol programmers going away for months at a time, which could be tackled with the shelf solution.

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Edwardes quits Mercury in favour of ICL

by Andrew Thomas

SIR Michael Edwardes is to replace retiring ICL chairman Sir Christopher Laidlaw. Edwardes is currently non-executive chairman of Mercury Communications and is to quit the post when his contract expires at the end of the year.

BP man Laidlaw has decided to retire after three years in office and will leave ICL next April. Edwardes joined the ICL board as a non-executive director last Saturday and is scheduled to become deputy chairman on January 1, taking over from Laidlaw on April 2. His contract is for three years and is renewable.

Edwardes will receive a salary in excess of £100,000, plus substantial share options. Laidlaw's salary, according to the most recently published accounts, is £74,000. Managing director Robb Wilmot gets £152,000.

Reactions to the news of Edwardes' appointment were favourable, and Mercury put on a brave face over his departure.

"He's been very good for us," said a Mercury spokesman. "You could always do with a man like that for a bit longer. A great deal

has happened under his chairmanship which has put us in the position of being up and running. We have got over many technical and commercial problems."

Mercury has appointed a replacement for Edwardes, and plans to make an announcement before the end of next week. Edwardes joined Mercury from BL in July 1982, becoming chairman in October of the same year.

Laidlaw, 61, said that he was retiring to make room for a younger man and denied that managing director Robb Wilmot might also be leaving. But ICL denied Laidlaw was leaving just a few days before he announced his retirement.

"Sir Michael is just the sort of

chairman that Robb Wilmot needs," said Laidlaw. "Between them they will make a formidable team."

City analysts were generally pleased with the announcement.

"It's bad news that Laidlaw's going," said Neil Barton of Cooke Lumsden. "He's well able to run a company, but the Edwardes appointment is good news - he's proved himself and has attractive features which will help ICL."

"Laidlaw may have been over cautious, and Edwardes is likely to be more adventurous."

"Some board members won't be able to stand the pace," continued Barton, "and within 12 months one or two may find him overwhelming."

"We're not interested in personalities," said ASTMS national officer Tim Webb, whose union represents 6,000 of the ICL workforce. "We know his record at Leyland, but he'll find it different - you can't rule by edict in ICL."

"We'll be seeking an early meeting with him to discuss his plans," continued Webb. "I don't think he's been brought in to do a hatchet job on the company. We want a more aggressive, visible chairman, a salesman advocate for the UK."

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EDWARDES... "Likely to be more adventurous."

Rodime wins big US contract

by Caroline Burgess
PUBLICLY-BACKED Rodime has won a \$7 million contract to supply Winchester discs to US micro maker North Star.

The Scottish based company is to supply 3 1/4 inch discs to North Star's factories on both sides of the Atlantic - in California and in Cork - over the next 15 months.

Rodime now gets 60% of its orders from the US. Its Californian sales office was set up at the beginning of last year.

The company is building a

manufacturing plant in Florida which should start production by the end of next year.

Malcolm Dudson, Rodime's managing director, described the deal as significant, saying: "As a growing number of US micro manufacturers come to set up European production facilities, Rodime's capacity to service them on both sides of the Atlantic will become increasingly important."

The high capacity RO 206 and RO 208 drives to be supplied are all to be manufactured in Scotland.

HP looks at the UK for research site

HEWLETT-PACKARD is looking at the UK as a new site for some of its 1,000 strong research team. The company's research director, John Doyle, met IT Minister Kenneth Baker and Industry Secretary Cecil Parkinson to discuss a UK site as part of possible plans to move its research centre from Palo Alto to Europe or Japan. Doyle said that there was still competition for staff at its current location in Silicon Valley.

CAP turnover

TURNOVER of UK systems house CAP rose 43% to £20 million in the year to April 30, 1983, leaving a pre-tax profit of £965,000. Overseas earnings accounted for 15% of the total revenue. Last year it recruited 101 graduates, taking its total staff numbers of 941.

Piracy meeting

A DOZEN UK software and computer firms are meeting tomorrow to discuss a one-year programme aimed at designing a standard solution to software piracy. The meeting is being led by the government's British Technology Group and the National Physical Laboratory. Participation by overseas firms is not ruled out. See page 6.

Circulation rises

COMPUTER WEEKLY has boosted its circulation to 120,000 copies, making it the highest circulation weekly computer journal in the UK. The move is part of continuing developments at Computer Weekly, which recognises the increased size of the industry it is serving. Last week, for example, saw the introduction of Management Review, a monthly supplement to Computer Weekly.

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West's software lead may crumble

by John Riley

THE Western world's lead in software engineering will fall apart unless universities shake up their computing courses and make them relevant to the real world.

This view was forcibly put in the IFIP'83 computer conference in Paris last week by Ian Sommerville of the University of Strathclyde Computer Science Department.

"Software engineering is the most urgent technological challenge which we face," he said,

"but everything will disintegrate unless we can learn to write large, reliable and cheap programs."

Sommerville believes that computer science teaching in universities is "hung up on a study of trivial programs" and that it is hindered because instructors are mainly from mathematical backgrounds who are obsessed with keeping the subject as a science.

"Computing is not a science - i.e. based on hypothesis and test but is concerned with creating artefacts and therefore has more in

common with engineering."

His description of software engineering teaching at Strathclyde was an eye-opener to European and American academics at IFIP'83. Strathclyde has done away with lectures, ignores teaching programming and orientates the whole course round one large software system.

"Programming is easy," he said, "but in software engineering the problem is in designing and how to solve problems. Students are immature - they think that 100,000

lines of code is just a scaled up 100 lines of Basic and don't understand the value of design."

Sommerville drums the importance of style and design into his students by giving them real world situations. "In the real world users change their minds with contradictory requirements; money is important; quality of documentation is important; and computer work involves taking and maintaining bad programs. That teaches them the importance of style."

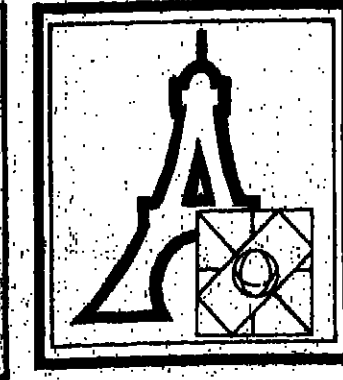
■ IFIP report - 28 and 29



Data storage - special report



CSA president Thomas retires on a high



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Thomson to surrender its computer interests to CGE in big shake-up

France shares out its electronics companies

by Jack Gee

THE French government has given its blessing to a division of power in the country's electronic industries between Thomson-Brandt and Compagnie Generale d'Electricite which will create a series of State-owned monopolies in key products.

CGE acquires a dominating role in the telecommunications industry through the creation of a new firm which regroups the activities of its subsidiary CIT-Alcatel in this sector with those of Thomson. Although the newcomer is to be called Thomson Telecom, its activities are scheduled to come under CGE's total control within three years.

Thomson will surrender its computer interests to CGE which has been told by the government to work in close concert with Bull, the national computer manufacturer.

Bull chairman, Jacques Stern,

has declined to comment on the nature of his new ties with CGE. Besides ending Thomson's ambitions in office automation, CGE also acquires control of its rival's activities in cables, a field in which CGE already ranks as the world's second biggest manufacturer.

In return Thomson gets precious little in taking over CGE's military division (a turnover of £88 million in 1982) and its household electronics venture Sintra which earned about £80 million.

Thomson, however, remains dominant in consumer electronics - television sets, France's videotape recorder industry, radar, airborne guidance systems and missiles.

Acquisition of CGE's small role in computer components and semiconductors could be a poisoned chalice for Thomson which is already encountering the cyclical problems inherent in this section. CGE will retain control over its

liquid crystal flat screen development.

The exchange of assets between the two companies, which were nationalised in February 1982 with France's other big industrial groups, confirms that even under State ownership the law of survival of the fittest still applies.

The government's aim is to make both firms better able to compete in world markets and to emerge as more attractive partners for foreign groups.

Last year Thomson, headed by militant Socialist Alain Gomez, lost £183 million, mostly from telecommunications. Its staff of 129,000, of whom 30,000 work in telecomms manufacture, now face severe pruning, although the government says that no dismissals must follow the rationalising of Thomson and CGE production.

CGE, whose managing director Georges Peberau has masterminded the division of power in the electronics industry in his own

favour, has a staff of 190,000, of whom 40,000 work for the successful telephone switching maker CIT-Alcatel. The firm was alone among the State-owned industrial groups last year in making a £53 million profit.

It is not yet clear how the new reorganisation will affect negotiations between CGE and Italy's Olivetti to develop and produce electronic typewriters, and the foundations for a French office automation industry.

The French and Italian firms have initialised an agreement to build 100,000 of these new generation machines each year. But signature of the go-ahead is being delayed pending agreement on the future of 33% of Olivetti's equity which is held through French State-owned holding companies.

Olivetti chief executive Carlo de Benedetti wants to buy back two-thirds of the French stake and sell it to AT&T in the framework of a joint office equipment venture.



GOMEZ... Thomson ambitions in office automation ended.

Unesco doubles information technology budget to £2m

by John Riley
UNESCO is to double its annual information technology budget to £2 million and set up an international IT awareness programme primarily for developing countries.

The announcement, by Unesco director-general Amadou M'bow at the International Federation for Information Processing conference in Paris, comes as an earlier Unesco IT initiative continues to decline. That initiative, the Intergovernmental Bureau for Information, set up in 1974 to help countries understand the impact of new technology on society, never got off the ground: it has attracted only 35 of the 159 member countries, and has not been supported by the US, UK, USSR or other computer manufacturing countries.

Brazil has recently pulled out and in the last week France signalled its intention to do so.

The new Integrated Programme on Informatics proposed by M'bow is expected to gain Unesco general conference approval next month in Paris and will involve all nations.

M'bow considers computer technology a "social event" affecting the whole planet and that "solidarity between nations is needed" as it develops. He warned of the dangers of "breaking the world into computer and non-computer areas," which the new programme seeks to avoid by providing training, computer education and public information in computing and IT.

"We want to involve all countries as possible in the programme," said Abdul-Kader Kaddoura, Unesco's deputy director-general for science. The programme will be run on guidelines, for example, on Environment and Marine Science programmes.

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MULLER... We should feed off US and Japan.

Insight calls for a Euro-centre

by George Black

EUROPE needs its own international research centre if it is to compete successfully with the US and Japan.

This is the main recommendation to the EEC Esprit and UK Alvey programmes by SPL, Insight Fifth Generation Group. Members of the group presented their findings to heads of the two programmes after a fact-finding tour of Japan and the US.

Insight director Bob Muller said he viewed the need for a central research unit as the most important discovery of the tour.

Our efforts should feed off the results of Japanese and US work, as they have done off ours, argues the Insight team.

A central research unit could

yield massive results, said Muller.

Insight reported that the Japanese national programme was moving ahead under strong technical direction by the Institute for New Generation Computer Technology.

American firms had responded by collaborating in the Microelectronics and Computer Technology Corporation. What Europe should do now was to organise a similar venture under strong leadership, led by acknowledged experts in the key areas.

Meanwhile top Alvey programme men are looking at a SERC working party report on intelligent knowledge-based systems, which could form the basis of one major element of the British endeavour.

Mercury cables go into BR's troughs

by Nuala Moran

A £2.25 million a year deal for the private telecomms company Mercury to use British Rail's trackside for laying its optical cables was signed last week. The cost is not only for land rental but also for servicing and maintaining the cables.

Sandy Skinner, Mercury's marketing communications manager, said he expects the cable laying to start before the end of 1983. Work has already started on terminal and repeater stations for line transmission equipment. Some of these will be new buildings; others will be extensions to existing BR installations.

The cables will form a figure-eight network centred on Birmingham, with the northern loop going through Leeds, Manchester and Stoke-on-Trent, and the southern loop linking Bristol and London. BR routes are ideal for these links, as they offer a clear route from city centre to city centre, with troughs for power and telecomms cables already provided.

When this network is complete in 1985, it will have 1,000 km of cable at a cost of £20 million. GEC has won the contract for the London-Bristol link. The London-Birmingham and Birmingham-Leeds Manchester installations will be done by BICC, with Plessey supplying the opto-electronics.

BR's director of signals and telecommunications will supervise the installation work, and BR engineers will be responsible for maintaining and servicing the cables. BR is now checking its cable ducts to ensure they are all in a suitable condition to receive the cable.

As well as getting the rental and the income for services related to

laying and maintenance, BR will get a small proportion of the network capacity for its own use. In agreeing this deal with Mercury, BR has in fact undermined its position as the owner of the second largest telecomms network in the country.

Mercury's network control centre will be built in Birmingham, also on BR land. It will monitor operations and detect potential faults. Skinner said he is confident that incidents such as the recent fire at a BR signalling installation, where all the cables were fused together by the heat, would not affect Mercury's service, as each message goes in both directions around the network.

Cable and Wireless, one of the main investors in Mercury, announced last week its participation in a similar venture in the US. It has set up a joint venture company with the Missouri-Kansas-Texas Railroad Company (M-K-T) to install a Mercury type network. The company will lay cable along 560 miles of track from Dallas to Houston via San Antonio and Austin, Texas at a cost of \$40 million.

M-K-T will have between 70 and 80% of the equity and Cable and Wireless the rest. The cable route will have a capacity of more than 24,000 voice channels, and will be used to supplement M-K-T's communications needs, which are currently being met by other telecomms companies. Capacity will also be sold on a wholesale basis, in minimum quantities of 45 megabits per second, which is equivalent to 672 voice circuits.

Cable and Wireless is having talks with other US railway companies to set up similar deals.

Nippon aims at a 10 mips chip

by John Riley

THE two prongs to giant Nippon Electric's (NEC) microprocessor strategy for the 1980s were announced in Paris last week.

Toshihiro Matsumura, senior vice president and a director of NEC gave some details of the company's general purpose VLSI microprocessor programme, and its move into dedicated microprocessors.

The V-Series of general purpose microprocessors aims at a 10 mips (machine instruction per second) chip by 1990.

The first two models, the V-60 and V-70, are both scheduled to appear by 1985. Their architecture comprises 32 bit general purpose registers, a high level language oriented instruction set (for C, Ada and Pascal), powerful software debugging support facilities, applications support with text-list processing and four gigabytes of virtual address space.

The V-60 will have one 16-bit

data buffer, will run at 1 mips with full CMOS (2,000 transistors) implementation, and three-stage peripheral structure with parallel operations of fetch-decode-execute stages.

"It is similar to the mainframe CPUs of the 1970s," commented Matsumura. The V-70 will have a 32-bit data-buffer running at 2 mips, with up to 700,000 units on the chip.

NEC is also moving into dedicated microprocessors. "That is a new direction for us," said Matsumura. NEC had developed peripherals controllers for signals and graphics, and its next generation of peripheral controllers would provide distributed processing support, speech recognition and image pipeline processors.

NEC's speech recognition processor, an SRP 7764, is speaker-dependent, and compares input word patterns with registered word patterns, using a

matching algorithm developed by the company.

It requires two million computations for 100 words.

Matsumura claims: "We can get 340 single words or 40 connected words on a chip with 99% recognition accuracy." NEC is also working on a speaker-independent word recognition processor.

Hardware, maintenance and software support will be offered by dealers who have been appointed geographically and by vertical market.

There are about 40 dealers at present, though the company has an eventual target of between 50 and 60 dealers.

The company says that it will provide an infrastructure capable of coping with its ambitious expansion plan.

This has been boosted by the recent injection of a generous £1 million investment from Prudential Assurance.

Dealers are offered discounts on hardware and software, and a single-user machine for demonstrations.

by Keith Holder

FOLLOWING its departure last week from the terminal distribution market, Rair has formed a nationwide dealer network to support the Rair Business Computer.

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Rair plans to expand its dealer network

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US giant sets its sights on Europe

by John Kavanagh

US SERVICES giant University Computing Company (UCC) is preparing to break into software products in a big way following a \$21 million double takeover. The company says this is just the start of the acquisition trail - and European firms are in its sights.

The \$140 million company's plans include a move into microcomputer applications packages: its first takeover involves Open Systems, a US firm with accounting packages for over 50 eight-bit and 16-bit machines. This deal is worth \$15.5 million.

Meanwhile the \$5.5 million purchase of banking software specialist Financial Software of America is nearly complete.

These moves follow a share issue in the summer which raised \$25 million specifically for takeovers, plus the formation of UCC Software Products in the UK, Germany, France and the Netherlands as separate companies from the traditional bureau operation.

"All this is part of a determined effort to get a big niche in the software market, especially in Europe," said Michael Cocks, director of the software products companies.



COCKS... Looking for a big share of the European market.

"So far we've concentrated on IBM systems software products in Europe but there's been no real effort behind it. Now we're getting going - and we're on target for 70% growth in software products sales in Europe this year. Overall, software products accounted for \$52 million worth of business in 1982."

Cocks said the takeovers were so recent that the company had not yet decided about selling the applications products in Europe. But he

saw scope for selling microcomputer software to big installations running IBM Personal Computers linked to mainframes.

On the systems software front UCC is looking for programmer productivity aids, such as development tools, plus products for installations using IBM's DOS operating system. At present UCC concentrates on big MVS sites. These new products could come from takeovers of European systems or suppliers, Cocks said.

THORN-EMI's retailing subsidiary Rumbelow plans to have a network of 500 viewdata terminals in its stores by next summer to support stock location and re-ordering and sales reporting.

The network will use micro-based terminals, supplied by Bishopsgate Terminals, which are capable of holding information on the availability of up to 600 items and of storing up to 75 pages of sales data to be collected by the warehouse system at night. Bishopsgate managing director

Douglas Craig-Wood said the system illustrated how the growth of private viewdata was being boosted by customising the application and the terminals to the users' needs.

"There is a market for standard terminals and off-the-shelf systems," he said. "But it is a mistake to force those on to users."

Bishopsgate came into existence in 1980 to supply terminals for the Stock Exchange's Topic system, now the world's biggest private viewdata system with 2,000 terminals and a growth rate of 30% a

year. The requirements for the terminals included transmitting 9,600 bits per second and the ability to be connected to any of the different kinds of data link.

MSC doubles its training hand-out

by Philip Hunter
THE Manpower Services Commission (MSC) has more than doubled its cash support for firms in the computing services industry so they can train their staff.

The total grant aid available in the next 12 months is £600,000, but there is now a limit of £750 per trainee, and no one firm can have more than 30 grants.

"We have managed to get training based on what people need," says Gordon Ewan, head of Cash, the Computing Services Industry Training Council, which will distribute the grants. Ewan welcomes the increased total cash available, but says he originally wanted £1,000 not £750 for each trainee.

Companies will now have to conform more closely to training guidelines laid down by Cosit and

the MSC, and will for the first time have to be members of Cosit. "You've got to show willing and join the club," comments Ewan.

Ewan says that several loopholes in the old grant scheme have been closed. Last year there was a concept called additionality, which meant that in some cases cash was only available to companies training more people than in the previous year. This discriminated against firms hard hit by the recession, says Ewan.

Another loophole was that some training firms claimed last year that their clients could make a profit from training with the MSC grants. "We will make damn sure that it doesn't happen again," says Ewan. With a single block grant this time, Cosit will find it easier to make sure that the training is really worth the money.

Ewan says he would like to see the MSC continuing to expand its support for training in real terms during the rest of the five-year programme, pointing out that £600,000 is still a tiny proportion of the MSC's annual £1,500 million budget.

The MSC hints that more money might be available next year. Rob Napier of the MSC's training group says: "We're saying to Cosit that we're sufficiently impressed by what you've produced so far to go ahead. But we reserve the right to pull out."

Napier says that the MSC's other programmes of support for the computer industry will be virtually unchanged in 1984. One such programme is for firms to send staff on courses in implementation of small business systems, limited to five grants per company.



EWAN... "Got to show willing and join the club."

Shortfall in IBM software and support, says report

by Keith Holder
IBM Network products are something of a curate's egg according to users' comments expressed in a Xephon report, *Networking in Practice*. The overall message is that while the hardware is robust and reliable the software and support leaves something to be desired.

A real expertise shortage is ascribed to IBM's support function, a view shared by John Barker, computer services manager for Aylesford Systems & Computer Equipment, who commented: "The biggest problem with support is when you try to upgrade your software. IBM changes what

it is offering so quickly that even its own engineers don't realise it." But, he added: "Its effort is usually very good." He went on to say that once installed and running the software he has used has proved reasonably reliable.

Part of the report looks at what users would like to see IBM do with these products in the future. Top of this list is the integration of VM into the mainstream networking products and improvements in network management tools.

Other topics included staffing levels, problem areas and user evaluations of individual products though no specific recommendations about what to do are given.

High street battle heats up

by Keith Holder

THE high street battle to sell software to the home computer user has been joined by National Magazine and HMV. Both companies have announced plans and products, aimed at Britain's one million users, offering games and educational packages.

National Magazine is launching Ebury Software this month at the Personal Computer World Show where it will demonstrate six early learning packages.

These are aimed at the three to six year old and will run on most popular makes including the BBC Micro B, Sinclair Spectrum, Dragon and Commodore 64. The

cost for each cassette is £12.95. They will be available through specialist computer stores, high street department stores and direct from the publishers. Each package has been produced in conjunction with a team of educational experts and programmers.

The company is keeping quiet about future releases, though Roger Barrett, publishing director of Ebury, said: "Some of these will be linked to topics covered in our major publications."

He sees a good market for this type of product, adding: "There are more microcomputers, per capita, in this country than anywhere else in the world and we believe

that there is considerable demand for quality software programs."

HMV is opening software departments next week in its main shops in London, Glasgow and Hull. These will be staffed by expert advisers hired by the company to help the public by answering questions about home computing and advising on computer games.

Software for Spectrum, ZX 81, Vic 20, Oric, BBC, Atari and Dragon systems will be held in store. A spokesman for the company said that this initial launch was designed to "test the water" and if it proved successful then similar departments would open in the company's other outlets.

SALES BRIEF

Barclays orders 600 more minis

DIGITAL Equipment has won an order for 600 PDP-11 minis from Barclays, following an earlier order for 150 PDP-11s. All the minis will be installed in the bank's branch system offering electronic mail.

The minis will run the bank's controller software developed by the bank to link branch networks with the private Barclays communications network.

Bank buys Arbat

ARBAT, the UK specialist in banking systems, has won a £170,000 export order, valued at £150,000, from Bank Nederland, Bank Nederland, a subsidiary of the Arbat computer business (CBT) to link up with the bank's mainframe and the public telex network.

Aim hits peak

ITALY-based OEM and sales company Aim has hit a peak in sales of Digital Equipment Corporation's PDP-11 minis this month. Major buyers include wholesale ironmonger Rose & Co, which is replacing a big system with a DEC mini system to run stock control.

NCC order

THE National Computing Centre has ordered £100,000 worth of Series 86 workstations from the UK's National Computing Centre. The machines will be installed at the centre's microsystem centres, to manage a directory for micro users.

Oilfield order

THE Middle East continues to see big orders to Ferranti Computer Systems. The latest contract worth £1 million, is for the supply of a third Argus computer system for installation at an Abu Dhabi oil production equipment.

CTL in the City

COMPUTER Technology (CTL) which heads the UK challenge to the Tandem in the market for hardware and software solutions to the financial sector, is launching a new City investment management company John Govey & Co. The company will be based on the Unix operating system.

Getting into print

LIBRA Computer Systems has sold the first of a new range of desktop publishing systems, the printing industry in the UK. The machine will be used by publishers for advertising management, which has already been taken up by Lloyd's of London and publishers Macmillan.

Veteran replaced

NIXDORF, West Germany's second largest indigenous computer maker, has sold one of its Model 10 computers to the UK. The machine will replace a year-old computer for the control and invoicing.

Bedroom check

OPTIM-MCS, the first London small systems company, has installed a hotel computer system for the Royal Hotel in London, which was opened this month. The system will handle reservations, and the use of the telephone bar in each bedroom.

Bureaux lose to insiders

by John Kavanagh

COMPUTING services firms are more than holding their own in the recession, with surviving companies growing at an average of 20% a year - and predicting a rosy future.

But the bureau business is under heavy threat and falling rapidly as a percentage of the total market as more and more companies move to in-house computing.

This emerges from the Computing Services Association's (CSA) annual report, which shows that 15% of its 192 members grew 50% last year. Another 40% grew by over one fifth. Total revenues were about £815 million and the members employed over 29,550 people.

But the recession claimed some victims, and if these companies' results are taken into account the

overall growth rate was about 15%.

The healthy state of services companies and their need for cash to fund growth make them prime targets for takeovers, the report indicates. Hardly any UK firms with between 100 and 200 staff have stayed independent. But the report notes that this could change because more firms are going for Stock Exchange listings to raise funds.

Bureau processing is still the biggest market segment, but last year it fell from 34% to 30%. Only one-third of the members thought it would grow in 1983. Software services is the second biggest money spinner, with 17% of the market, while consultancy and turnkey systems services have about 14% each. Software pro-

Apple scraps Lisa software deal

by Howard Katten

APPLE Computer has cancelled an arrangement under which Cullinet was developing software to permit interfacing the Lisa with IBM mainframes. The move follows price cuts for the Lisa.

Introduced in January costing \$10,000, the Lisa was seen from the start as an impressive product. But industry observers had several questions about its viability, such as the lack of a software base, the lack of upward compatibility of previously-written Apple software, Lisa's high price, and the inroads into the business world already made by IBM.

Apple's price reductions - a Lisa will now cost \$6,995 with no software, \$8,190 with the six software packages originally introduced with it - are generally regarded in the US as at least tacit

admission that sales have been lagging. Apple is reported to have spent about \$50 million on development costs.

In addition, the original price tag is seen as having put off smaller firms which otherwise were attracted to the idea of microcomputers for their businesses.

Cancellation of the Cullinet pact will not help sales. Software for linking IBM Personal Computers to mainframes (chiefly those with IBM's Escutcheon) has been a hot area in America in recent months, with most major mainframe software vendors announcing such a package.

Lisa has lagged conspicuously behind in this area, and prospective buyers in larger corporations are said to have been disappointed.

Philips picks Unix for office

by Philip Hunter

PHILIPS' long-awaited attack on the office automation market, to be announced at next month's Telecom 83 exhibition in Geneva, will be based on the Unix operating system.

Unix has already penetrated many markets, but until now has not been favoured in office systems.

The decision to go for Unix meant looking for a micro that runs it, and Philips has plumped for US micro maker Plexus and placed a \$40 million order covering the next three years.

Philips says it chose Plexus from among 20 other supermicro makers because the micro runs the Unix System III operating system approved and supported by AT&T's Bell Laboratories, which first developed the system.

"Many other manufacturers of Unix-based systems employ 'lookalike' versions of Unix that do not provide the vendor independence of Unix," said Philips spokesman.

Unix System III is the most up-to-date version of the operating system and contains all the promised facilities such as source code management.

Philips says the Plexus supermicro was also favoured because they implement Unix efficiently, enabling up to 40 users to cram on to a single P/60 supermicro.

Philips had planned to launch its office automation system at Hannover Fair last spring. But the company had not been able to settle on the right micro to control the networks, and in the end had to go outside the company to Plexus.



THOMAS... "Growing government and City confidence."

ducts now accounts for 8% of the business.

Hardware accounts for a "surprisingly high" 15% of CSA members' revenues. Bureaux are boosting income by selling microcomputers and terminals, while software houses are getting more involved in providing complete systems.

Retiring president Peter

Thomas of Pactel said there were firm signs of growing government and City confidence in the industry. The government had announced a further £15 million for the Software Products Scheme and the Manpower Services Commission had made more money available for training. There had been more City investment in services firms than ever before.

Hazeltine offshoot bid to raise takeover cash

by Nuala Moran

ESPRIT Systems of New York, which became independent of the Hazeltine Corporation in February, is offering 1,100,000 shares to the public on the New York exchange. They are being offered at between \$12 and \$15 each, with the sale could raise up to \$16.5 million.

Part of this will be spent on financing acquisitions in computer peripherals and small business computer systems that will be manufactured offshore and sold through the company's worldwide network of 75 dealers.

Although it is still a private company, Esprit is one of the five biggest terminal manufacturers in the world. It achieved this status as a division of Hazeltine. But the high overheads that Esprit had as a division of Hazeltine meant it lost \$3.5 million in 1982-83.

Four employees of Hazeltine bought out the division for \$5 million. This gave them, with a fifth founder, the rights to the Esprit product line of seven VDUs and to use the Hazeltine name for up to two years. They also took on the 50 or so staff employed by the division.

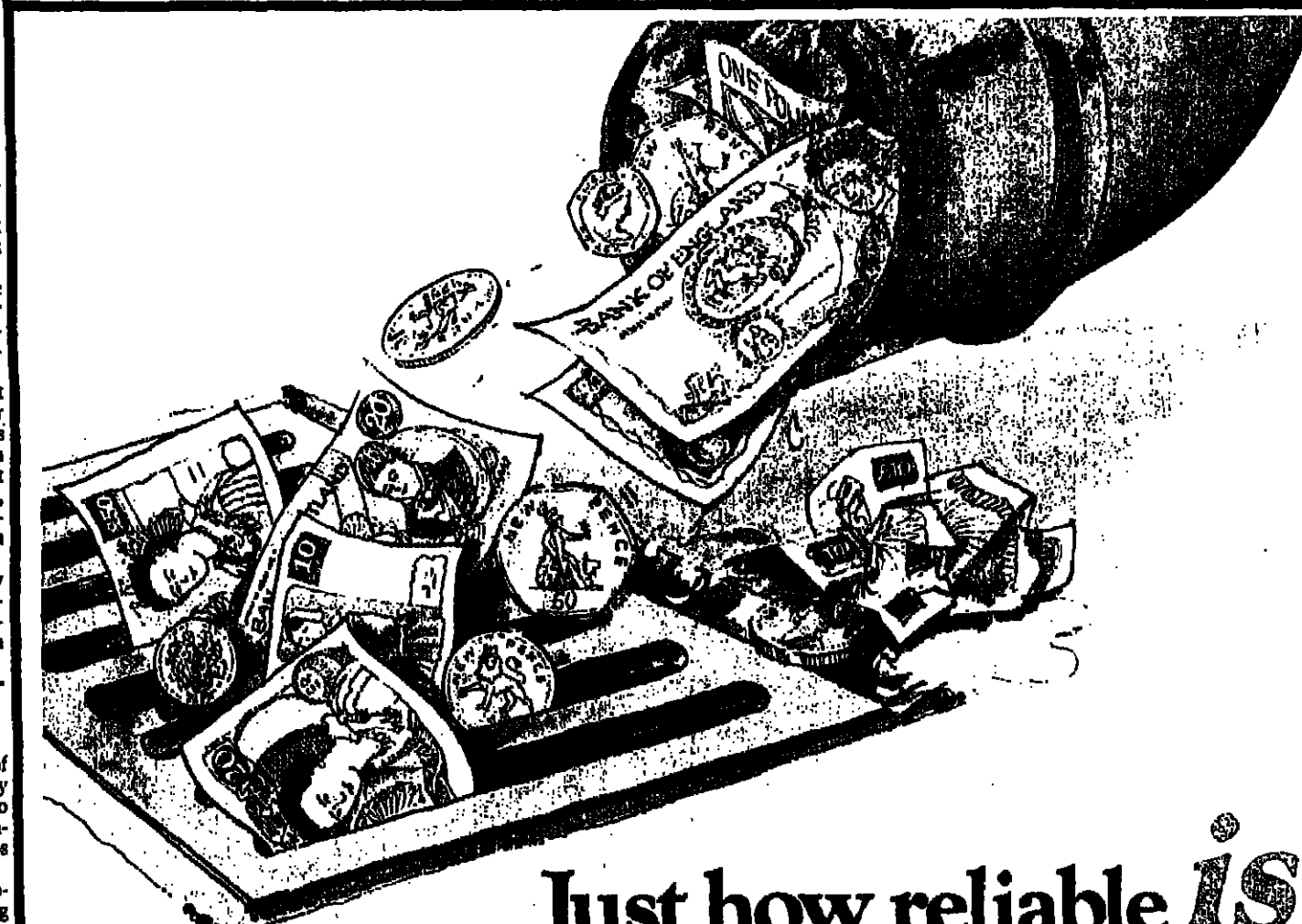
Allan Maurer, Esprit vice-president of marketing, explained that the division went ahead because Hazeltine could not keep pace with the changing market for terminals. "The way the terminal market is going you don't need heavy investment in new products; what is needed is rapid design times and low cost manufacturing."

At the time of the takeover manufacturing was in New York. Maurer arranged for production to be moved offshore to Korea and Taiwan. Esprit also set up a company in Hong Kong.

"All research and development work is done at our headquarters in New York," said Maurer, "but by transferring our manufacturing offshore costs have been cut right back. At the same time, as an independent company we did not face the same overheads we did as part of Hazeltine."

These adjustments in expenditure mean that Esprit can keep its prices down and appeal to the low end, non-programmable market which is estimated as growing at 20% a year worldwide.

Esprit sold about 24,000 terminals in the first six months of its independence. This compares with 34,000 which Hazeltine sold in 1982, an increase of about 40%.



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ADMISSION FREE

'Protect consumers from electronic payment'

by Donald Kennett

LEGISLATION may be necessary to protect consumers from error, fraud and other ill-effects from the use of electronic payment systems, according to the Office of Fair Trading (OFT).

Speaking at EPOS 83, the fourth European congress on automation in retailing, OFT consumer affairs director Clive Newton said that the banks and the Videotex Industry Association had already provided some safeguards for consumers involved in electronic transactions

in shops, at cash dispensers and via Prestel.

But microelectronic systems made it easy for companies to break into the market for money transmission services and the new consumers would not be bound by any voluntary agreements between pioneers.

If manufacturers, retailers and banks paid attention only to their own needs, he said, consumers could suffer ill-effects that prompted them to obstruct development which would otherwise bring significant increases in efficiency.

No definite requirements for legislative change had been identified, he said, but the risks included fraudulent debits being made from private bank accounts, incorrect debits or credits occurring because of technical faults and privacy being eroded through account details reaching third parties.

Electronic funds transfer (EFT) systems might need to be governed by such measures as limits to customers' liability and extensions to the forthcoming privacy controls to cover credit reference agencies.

Visenda-based services should be required to give confirmation of a customer order as a matter of course and to archive the data collected from response frames. Neither of these requirements was included in the VISA code of

practice, but in any case legislation might be necessary to make them apply to non-VISA service providers, to videotex networks other than Prestel and to interactive services based on cable television networks.

When direct broadcast satellites were introduced, he added, an international solution would be needed.

Professor Grigor McLelland, chairman of the distributive trades' Little Noddy (Economic Development Committee), said that over the next two or three years the distributive trades would become the biggest users of information technology after the government and financial services sectors.

There was a massive comprehension gap between the new technology and the smaller trader, he added, and to combat this the committee was running a conference aimed at small traders on October 27 in Solihull.

There was also a proposal to set up a national advisory centre for technology in the distributive trades that had been warmly welcomed up to Ministerial level. The proposal had come from an EDC working party that had reported in May and the centre was now likely to be set up in Manchester in association with the Manchester Business School.



NEWTON... "Consumers could suffer ill-effects."

At last — more cash for the IT campaign

by John Kavanagh
THE government is putting up £250,000 to keep last year's information technology awareness campaign going for another 18 months.

But industry people close to the IT82 campaign say the amount is far too little, and they point out that it is coming nine months after the end of last year's programme. During those nine months the government has relied on the IT82 committees to carry on last year's work on a voluntary basis.

The money will pay the salaries and expenses of 10 regional co-ordinators. They will work closely with local Department of Trade and Industry offices and with the regional committees. The jobs will be full-time but last for only 18 months.

The government has also bought two more caravans to mount mobile exhibitions on information technology. One will show an automated office and the other will concentrate on computing in re-

tailings. These will join the six from last year and tour the country. They will be run by the National Computing Centre.

"The funding is not enough," said Alan Benjamin, director of IT82 and a full-time director of software house CAP. "A regional co-ordinator won't be able to do much with £25,000."

But, he added: "They will be important in keeping local events going. And their close contact with the Department of Trade and Industry will mean the department's aims will get through to the committees immediately."

The department said there had been a lot of goodwill from committee members. People had given up their time, and companies had provided exhibition space and meeting rooms for free.

The department added that the emphasis would now be on information technology awareness among business people, rather than the general public.

Dennis Blackwell, chairman of a



BENJAMIN... "The funding is not enough."

British Computer Society information technology working party, welcomed the plan, but said it should have been announced a year ago.

"It's a very good idea to keep the momentum going and it's better late than never," he said. "But I doubt whether the amount's much use."

Piracy reaches the end of the plank

by Claire Gooding
SOFTWARE piracy could be at an end if manufacturers adopt the invention of an Israeli professor. Adi Shamir of the Weizmann Institute, has solved the problem of preventing people from making illicit copies of software from one disc to another with a hardware device.

The solution involves altering the disc drive so that anyone attempting to copy software will cause a machine crash. A patent has already been applied for Yeda, a development company linked with the Weizmann Institute.

Shamir, an expert in cracking protection codes, set out to find a way of preventing the most common type of software theft, whereby users simply make a disc copy of a borrowed product.

He admits that his system will not prevent determined software thieves, but points out that it is worth stopping the less expert pirates, as he estimates that 90% of business and games software is now pirated.

"It was just a question of finding the key," he said. "The system is cheap to implement and doesn't involve any modification of home computers."

Because the system uses the electronic impulses emitted by the disc drive, software companies will be able to make sophisticated use of it. Certain patterns could be built into programs so they can control the number of times the

program runs — an idea useful for software rental and for companies than for over counter sales.

The system could also prevent abuse of modems, so unauthorized callers trying to tap into someone else's software could no longer software complete with data.

Shamir draws a parallel between the software and the recording industry in the problems caused by illicit copying. But the recording industry has also tried to use pirates by making alterations to the hardware and has failed. Shamir says the technical complexity of the technical complexity of the system is a noise technique, which is successfully prevented from being copied on to tapes, hence the sound reproduction and records were broadcast.

This story has some relevance to Shamir's device. Several one have been made to find but solutions to what is, in fact, a ware problem. These solutions cause difficulties for users, who may not be able to make backup copies, while such as the dongle, which is package into a particular package limit portability, which is increasingly important.

Another problem is the commercial one faced by software houses using a system that depends on manufacturers to their kit. Manufacturers are not willing to spend money on someone else's problem.

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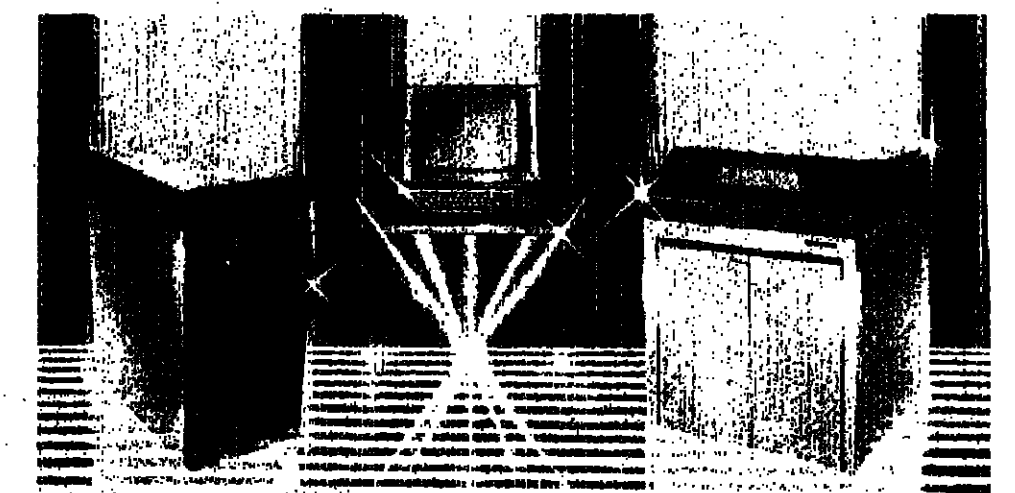
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Banks to share self-service

by Donald Kennett

SHARED networks of self-service banking terminals are becoming desirable and inevitable, according to the president of a leading US shared network operator.

Robert Jansen, president of Texas-based Affiliated Computer Systems, told a Philips seminar on self-service banking that the benefits of sharing terminal networks were formidable. He warned that smaller financial institutions may need them just to survive.

Automated teller machines (ATMs), whose main function was to dispense cash, had already brought benefits to single-user network operators and their customers,

he said, but these would lead on to point-of-sale (PoS) systems and home banking that would make shared networking essential.

His company, whose Inquest network, he claimed, was the first profitable and successful shared ATM network in the US, recognised that it would have to get together with its biggest competitor to tackle the PoS market.

The two biggest nationwide networks — Cirrus, of which ACS was a co-founder, and its rival Plus — were already discussing how to co-operate on PoS, though not yet on ATMs.

"The sharing concept has made us the number one proprietary net-

work in the US," Jansen said. "Does anyone here want to do with us? We're ready and willing to share our audience of banks and building society technical executives, managers, and the experience would translate directly to the UK, as the US has 100 banks and the UK only 14."

But Jansen quoted Leeds Building Society chief Peter Lush, saying that building societies provide a full range of retail financial services including ATMs. The Building Societies Association's council was last week considering a report from CAPS recommending a consortium to operate a shared ATM network.

System cuts fuel bills in schools

by Caroline Burgess

A COMPUTERISED temperature control system in 17 schools is saving the Grampian Regional Council £200,000 a year on fuel bills — a saving of about 20%.

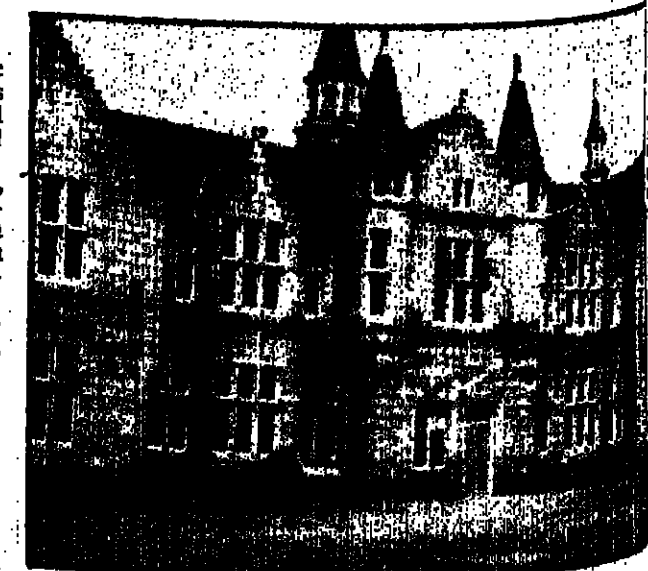
The first stage, costing £250,000, was installed a year ago and covered nine schools. Since then a further eight have been brought into the scheme at a cost of between £15,000 and £30,000 each.

A large number of sensors monitor temperatures, wind speeds, rainfall and the heat of the boilers. Each school has a microcomputer, which collects the information and controls the heating system.

Information is then sent to a central minicomputer via the telephone network. There it is stored on a Winchester disc, and can be viewed on a screen or printed. The minicomputer is in the council architect's department.

Grampian Regional Council has an annual fuel bill of about £9.5 million. It hopes to extend the system to most of its 400 schools, as well as its offices and old people's homes. But money for this is not available at the moment.

Money saved on fuel bills will go to a general fund to help keep the



Fuel bills in schools can be cut by 20%.

rates down. The cost of extending the system has to come out of a different budget.

Atlantic Instruments, a subsidiary of the Scottish company Lyle Shipping, supplied the system after the council put the job out to tender at the end of 1980. The system was designed to meet

the needs of buildings of various sizes and with different heating systems.

It is claimed that the system will save between 18 and 20% of costs, and be viable for any building with an annual fuel bill of £20,000. Atlantic has installed other systems in the UK.

The smaller machine holds sway at Sicob

John Riley visits France's major computer exhibition of the year

THERE are few surprises at France's largest annual computer fair, Sicob, which ends this week. The emphasis in the computer section of this Paris-based, 10-day event is on small machines, particularly multi-user and networked microcomputers.

Many of the foreign exhibits have already been launched earlier in the US and the UK. This illustrates the delay caused by the language barrier in adapting machines for the French market.

Despite the increasing computer sophistication of the French public and the excellent shop window provided by the exhibition, British exhibitors were thin on the ground - only about seven companies had stands.

Several companies, including Digital Equipment, Data General and Prime Computer, presented integrated office systems. Several recently-launched superminicomputers, including Norsk Data's ND-570/CXA and Prime's 9950 machines, were also on display. The IBM System 36 had another airing - the star of IBM's stand.

Perkin-Elmer showed its 3205 32-bit processor and announced

Unix additions. Other 32-bit offerings included Data General's Desktop Generation and Gould's PS 3000 machine.

The French company, Logabax, marked its move into fault tolerant hardware with the launch of its Hyper 32, which is a revamped version of its Stratus 32 machine.



British exhibitors were thin on the ground - only about seven had stands

but with fault tolerant modules, based on two 68000 chips. This launch may mark the beginning of a shift towards acceptance of fault tolerant machines among French users.

"The French think that if there are problems they will be software problems and not hardware prob-

lems," said a spokesman from Tandem, the Non-Stop computer manufacturer. "It has been difficult to get the idea of hardware fault tolerance across to them."

Small business microcomputers dominated the computer section of Sicob. Most demonstrated multi-user capability or various local area network links.

NCR, which displayed its 9300 32-bit chip, also demonstrated the three buttoned mouse attachment that will be generally available on its Decision Mate V machine in 1984. The new-Hewlett-Packard HP-150 touch sensitive screen micro presented an alternative way of communicating with the computer.

Osborne's stand had, as a result of the company's collapse, been snapped up at very short notice by another American micro manufacturer, Zenith Data Systems, which has been on the waiting list for a place in Sicob's main exhibition hall for a considerable time. It showed a dual 8085/8088 multi-user, multi-tasking, IBM PC compatible micro.

This year has seen much upheaval in the French computer industry, with mergers and de-mergers. Consequently the major French company, Bull, had no new microcomputer offerings, although announcements about its minicomputer strategy are expected soon. However, it has launched a network of retailers and distributors for its multi-station, 16-bit micro.

The recently formed subsidiary of the Matra Group, Matra Micro Systems, announced its plans to produce a 16-bit micro based on Intel's IAPX 186 chip, and announced an order of 40,000 of its current 16-bit micros for the education market in the French-speaking Canadian province, Quebec.

The British presence was strongest in the distributed microcomputer area. Five companies, including ICL, are now tackling head on various parts of that market in France.

ICL was at Sicob in force. It is moving from strength to strength in France - according to a French spokesman, French turnover accounts for 10% of the total company's turnover.

In the main exhibition area it exhibited its latest version of the Perg, the system 25 Model 21, the DRS 20 Model 25, its updated personal computer and its recently launched 9518 point-of-sale terminal.

Scottish-based Future Technology Systems, which recently signed a £5 million marketing agreement with British Telecom, stepped into France for the first time at the exhibition with its Intel 8086 machine, which runs MS-DOS simultaneously with CP/M 86.

Future is hunting for an OEM deal in France such as that recently achieved with Daisy Systems in the Netherlands. "We have been

concentrating in the UK market up to now, but are beginning to spread our wings," said marketing communications manager Mike Smith.

Another UK company at Sicob looking for distributors was Plessey Microsystems, which recently set up a French subsidiary. It was showing off its Motorola 68000 and Multibus-based System 68 supporting Unix. Its sister company, Plessey Peripheral Systems, which provides the maintenance, exhibited its 7500 machine, based around the Digital Equipment VAX 11/750 32-bit minicomputer.

London-based Rair, following considerable success with its Business Computer in Germany after exhibiting it at Hannover Fair, launched the machine in France at Sicob. According to its manager in Germany, Gunther Krauss, Rair now sells more of the machines, based on concurrent 16-bit Intel 8088 and eight-bit Intel 8085 chips, in Germany than in England.

Another London-based micro manufacturer, Shelton Instruments, was at Sicob last year and is now setting up a French subsidiary and arranging to sub-contract assembly of its eight-bit/16-bit multi-user microcomputer, Sig-Net, which is based on a Z80A chip functioning in tandem with an 8088 chip.

Several smaller British home micros were exhibited by distributors in the Sicob Roubaix, a separate exhibition aimed at home and small business computers.

Sinclair, Acorn and Dragon were demonstrated enthusiastically on the stands. Among the peripherals, laser printers attracted much interest, with Burroughs and Hewlett-Packard both presenting their machines, as well as IBM, Canon and Siemens.

The French company, Bull, believes that it has stolen the laser printer technology's thunder by launching a printer based on a new technology, magnetographic technology, which is claims can print 90 pages a minute. Called the M 9060, the technology involves magnetising heads mounted on a drum, attracting ink powder to the magnetised zone, heat sealing it in, demagnetising the heads and then continuing the cycle.

Control Data, which geared its presentation heavily towards OEMs and engineers, displayed the first 31min Winchester disc, its CDC 9270-6, the Cricket, to be shown at Sicob.

The Sicob exhibition is in its 34th year, and has become overcrowded with space scarce. The computer exhibition is cramped into the third and fourth floors, creating a waiting list for newer companies wishing to exhibit.

The organisers of Sicob have been examining another possible venue for the exhibition to the north of Paris, but so far have found no suitable alternative.



DE LANGE... "Documentation must all be in French."

Exporters must lose their English attitude

THE difficulties for British computer companies exporting to France are exaggerated, say British companies exhibiting at Sicob. On the contrary, there are many opportunities and a lot of goodwill to exploit if British companies adopt the right attitude.

"The key to success is to make your product as French as possible," said Hans de Lange, general manager of Rair's subsidiary in France, set up last year.

"The main mistake manufacturers make is to be English in their attitudes," he added. "Screens, messages, keyboard and documentation must all be in French - that is the key to acceptance in the French market."

An important psychological barrier is the keyboard. In France, instead of starting with "qwerty" it starts "azerty". Rair has a facility that intercepts all screen messages on the front of the operating system, which allows speedy and

practice that can save up to month's delay in all payments.

The reason for setting up manufacturing plants, or sub-assembly in France is to make the public sector multi. However, Japanese companies have already done this in manufacturing in France.

"We would have no data major calls for tender in the sector, even if we came on the said Serge Kabakdian, general manager for Gey, Sord's distributor and himself from a French nationalised company.

"So we concentrate on private companies, establish a reputation for quality and get approached by the public sector. We have an account with the Bank de France and have sold them one of our machines," he said.

Asked why he stood in France rather than with Gey, Shelton explained: "Bull, Paris, we can cover 40% of the French market in a day's trip in the Paris region, whereas Gey is harder. It is more spread out, you need a larger investment of the same degree of penetration."

Gunther Krauss, head of Rair Germany, thinks, however, the situation in Germany has changed for the top end local microcomputer companies. "General minicomputer companies crashed recently, such as the Computer and Redaktor, and mini dealers are wide open for top end PCs," he said.

The prices of microcomputers are, according to Francois, a general European manager at Zenith Data Systems, 15% lower in the UK compared with those in France.

"I can't understand why British distributors don't take advantage of that," he said.



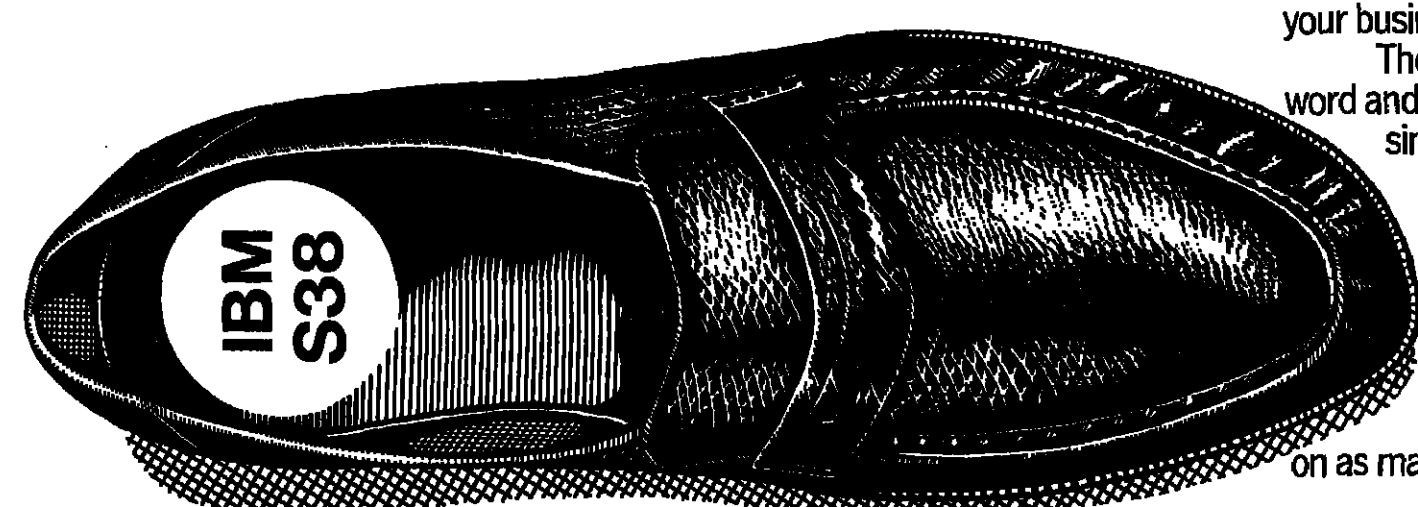
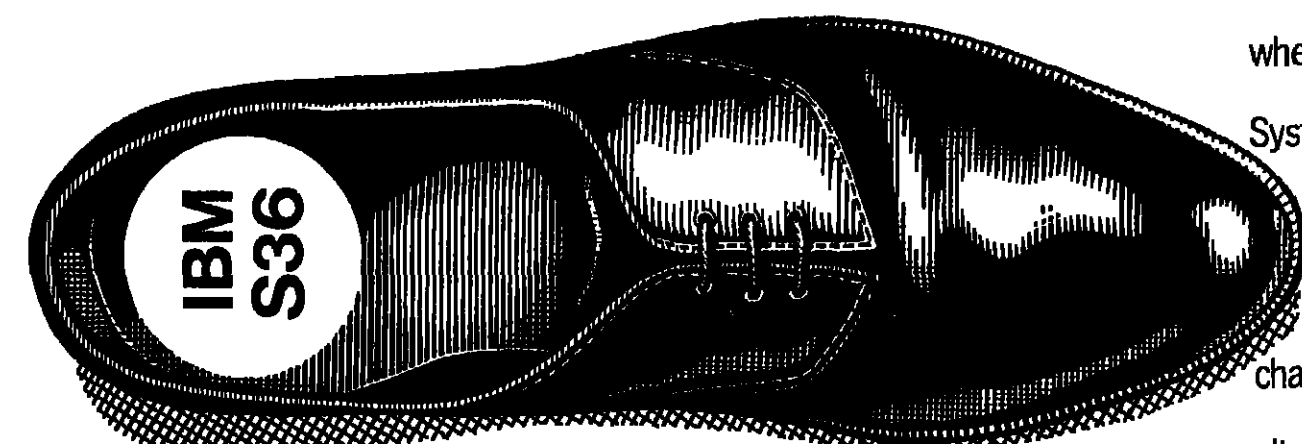
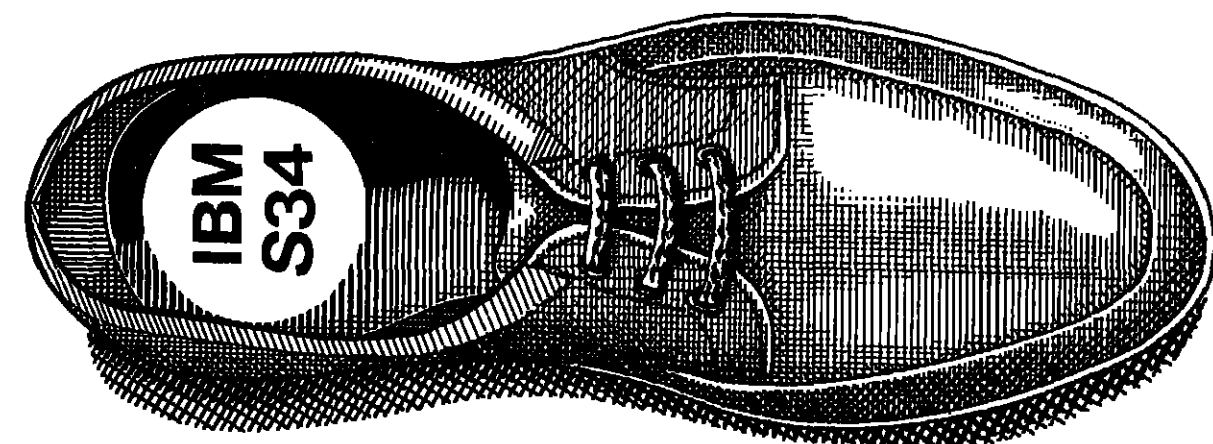
cheap translation of screen messages into any language. The keyboard is "totally soft" too, and can easily be reconfigured.

Most companies agree that it is important to set up a French subsidiary and also, if they wish to break into the public sector market, set up manufacturing facilities in France.

The advantage of setting up a subsidiary was explained by Chris Shelton, managing director of Shelton Instruments. "We are in the process of setting up a French company so that we can export to ourselves and retain control of the credit control documents. In



SHELTON... "We can cover 40% of the French market in a day."



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Cord pulls in NatWest upgrade

A £460,000 contract to upgrade National Westminster Bank's foreign exchange dealings system has been won by Cord Designs of Staines.

This firm came to public notice when it bought Altergo Ireland after the Altergo parent company crumbled earlier in the year. But the NatWest job has been awarded to another arm of the group, the Zeus Hermes division, which Cord acquired in November 1982.

It is the first big undertaking for Zeus Hermes since it came under Cord's ownership and will keep a systems team at the London office busy for a year.

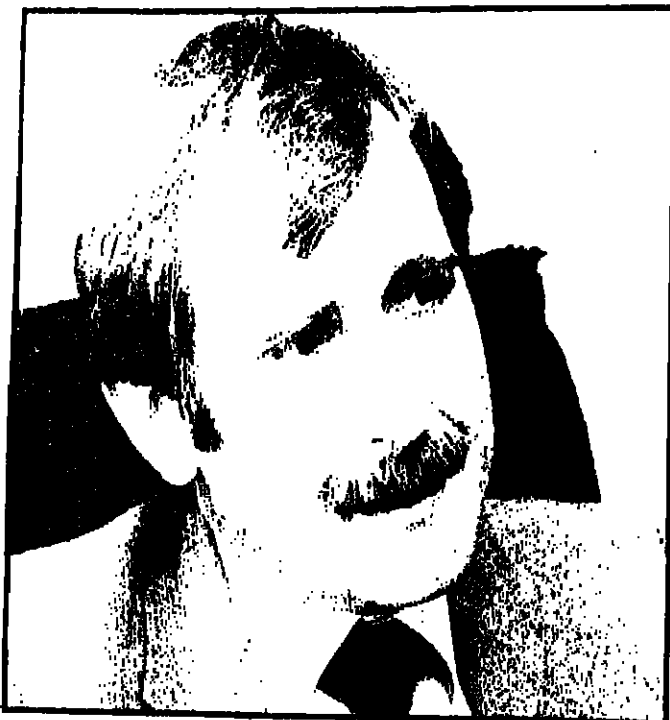
It involves installing 13 General Automation minis at the World Money Centre and NatWest

tower, linking about 90 screens with real time Fortran and Assembler programs.

Zeus' 20 systems experts were responsible for providing the £600,000 network installed by NatWest in 1980.

Cord's identity has been something of a mystery in the industry since it surfaced alongside the much better known Data Logic, of the Raytheon electronics empire, and Thorn-EMI's Software Sciences, as a buyer of the ailing Altergo operations.

Behind it is a small London venture capital house, Innotech, which specialises in high technology investments and one of whose directors is David Sainsbury of the supermarket family.



PENNEY... Expects a revenue jump.

The partnership with Innotech was sewn up at the beginning of 1983, after Cord had talked to about a dozen financial institutions to get backing.

Cord is expected to have an annual turnover of £1.25 million when its trading year ends on September 30, but profit will be

Finance modelling takes an Encore

by Claire Gooding

ANOTHER financial modelling system has arrived in the UK to lure users away from well-known products such as EPS-14.5 and Micromodeler. The Encore system comes from Perot International, which originally wrote the Micromodeler package for 8-bit machines, but broke away from UK supplier Intelligence UK earlier this year.

The new decision support system takes the principles of Micromodeler up into the 16-bit market. While Perot is anxious that the package should be seen as a new market entry, not just a re-write, Encore will support programs written for Micromodeler (the trade name still owned by Intelligence UK) and Perot's own 8-bit offering, Modeler.

Encore's entry to the market is likely to trigger a price war. The most widely used system, EPS Consultants' FCS, is selling for just under £1,000. Intelligence UK, since its bitter split with Perot, has been concentrating on its own 16-bit package, Modeler 16, which sells for £395.

Encore, which works only on

16-bit machines, is on sale in the UK for £395. The package has been built to take advantage of features, such as windows, graphics and 32-bit addressing, with emphasis on ease of use.

According to Perot UK's Terry Thomson, Encore offers everything that its competitors offer and more, for a much lower price. The system includes a text entry and edit spreadsheet which displays windows; an English modelling language; a file library; a programming language; a report writer; a graphics and sophisticated window display facilities.

The function library has been adapted to the UK's tax and accounting laws but, according to Thomson, Encore is also available to the UK and selling.

"We are selling successfully against Micromodeler and are choosing it in preference to Modeler 16," he said.

Although the product does come on to the UK market, Thomson has orders for 45 copies.

Personnel system on way to UK

A NEW personnel system, claimed to offer more detailed and comprehensive facilities than competing products, will be marketed in the UK soon.

HR+ (human resources plus) originated with Dynatron, a small software house in Alabama, from which it was bought by the top financial packages firm, McCormack and Dodge. This firm wants to include it in its forthcoming range of Millennium programs, linking IBM mainframes and micros, and has already installed it at two sites in the US.

It will be introduced into the UK towards the end of the year by RTZ Computer Services of Bristol, the Rio Tinto Zinc subsidiary which also acts as distributor for McCormack and Dodge.

HR+ is seen as posing a threat to established payroll/personnel systems, such as PPL's Cyborg system, MSA's Q-Pac and Peterborough's Unipersonnel.

Education centre opens

A PURPOSE-built education centre in Maidenhead, Berks, run by software industry leader MSA opened on Monday.

It accommodates up to 200 people, with 50 terminals for on-line training, as well as a lecture hall, workshops and audio-visual facilities.

Chief executive John Imlay said the centre, staffed by 15 of MSA's training division, made the firm the largest independent software education enterprise in Europe.

Software File is compiled by George Black

OS designed for Japanese machines

MICROSOFT has introduced an 8-bit operating system in 2" which will be the standard new range of Japanese home computers. MSX-DOS is designed to be made by 15 new micro manufacturers, to be launched in the UK next year.

The Japanese group, which includes NEC, Fujitsu, and Hitachi, approached Microsoft, whose DOS system was adopted by 3 for its PC, and manufacturer to provide for a joint development project on the home computer standard MSX. Components include Zilog's Z80A chip, the Instruments' video processor and Microsoft's M-Basic language.

The system could give Europe and US software writers access to the previously inaccessible Japanese home computing market.

Range extended

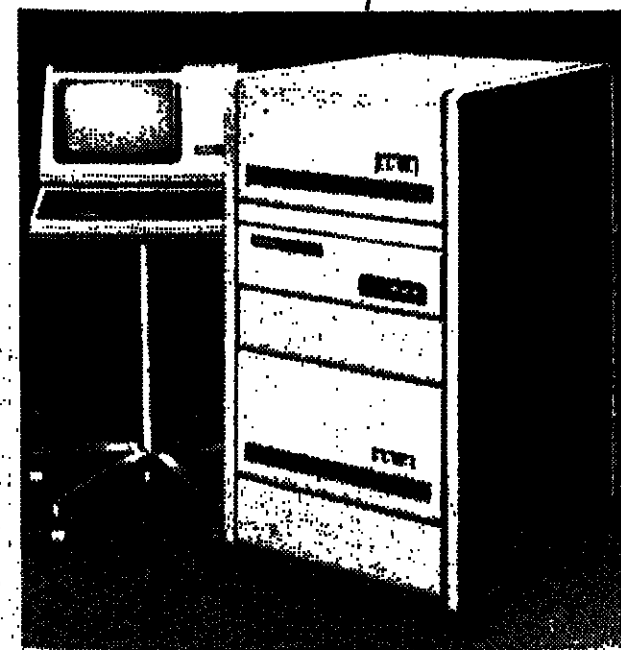
DYNATECH Microcomputers, a Codewriter program generator, has extended the range of products from the IBM PC to Commodore machines and Apple II and Sirius/Vision. Dr Thorne, chairman of the Codewriter company, said orders were from 5,500 to 5,000 a month.

Fee for Online

WATFORD software house is to distribute the Online 2000 International range of products. They include the basic CICS applications tester, CICS security system and IBM mainframe-micro interface called Omnalink. Fee is about £70 for the basic package using OSI products.

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MICRO NEWS

Texas moves into standard cells market

by Keith Holder
SEMICONDUCTOR manufacturer Texas Instruments has moved into the standard cell technology market with devices to offer greater flexibility in design.

The first batch of devices is compatible with existing CMOS catalogue functions but allows the designer to amalgamate chip precursors into a single unit, saving both on silicon and space. Thirty devices are already available and they will double by the end of the year.

Texas' European semi-custom manager Harry Cooper described the move as "a milestone in the TI semiconductor group".

Development plans on a number of products are already underway. Linear functions are promised for mid-1984 and cell cores for microprocessors by 1985.

Designers will face a 16-week delay from design to completion, though a company spokesman said this would reduce to about eight weeks next year. Manufacture of designs is carried out in the US at present, but a European site will be operational soon. Manufacture in the UK will be at the company's Plymouth facility.

The main European site will be at Bedford, where designers will be able to get advice and help using the company's design tools. Designs can also be tested before committing them to production at the centre.

The company is keeping quiet about the size of its investment in this venture, but a spokesman said it was very large.

The market for standard cells is expected to increase as designers look for more effective use of silicon.



COOPER... "A milestone in the semiconductor group."

France panics as chip prices rocket by up to 1,000%

by Jack Gee
FRANCE'S computer industry is lagging behind Britain and West Germany in the rush to buy microchips and its orders are expected to rise this year by only 13% in value, and 4% in volume, compared with an average annual increase of 20% until now.

A mood of panic has seized French electronics and computer manufacturers in recent weeks following rises in chip prices ranging from 70% to 1,000% by Japanese semiconductor firms.

Although confidence in the future of France's five-year electronics plan is weak, manufacturers are now ordering chips in fear of being out of stock when demand for their products picks up again.

They believe that, although their economy is stagnating and zero growth could last for at least another year or two, they might also have to contend with a worldwide dearth of chips.

The only sector of French in-

dustry which has immediate requirements on a big scale is military equipment. Chip orders incorporated in radar and missile have increased tenfold in the last few weeks.

Electronique Actuelle, a leading French trade publication, recently said that orders for C-MOS and S-MOS memories until next year.

Orders for integrated circuits the free market in France are running 50% below the level for the same season last year.

Cutbacks in construction, French nuclear power, and have seriously affected demand for chips incorporated in control systems.

Chip makers regard France as an unpromising market compared with Britain, now the big selling area in Europe and acribed recently as "an oil boom" by Dedy Saban, vice-president of European marketing.

Competition heats up for A4-size portables

by John Kavanagh

LESS than a year ago Epson was one of the stars of the Comdex exhibition with its A4-sized portable computer. Here was a "real" programmable computer which you could put in your briefcase.

Epson had the market largely to itself until the last two months, which have brought A4 computers launched by Tandy, Convergent Technologies and Olivetti. These firms have had time to note Epson's approach and form their own opinions - and the results have been very different.

The Epson HX20 is from the Japanese firm Seiko. Tandy and Olivetti are selling a computer from another Japanese company, Kyocera, which is purely a manufacturing concern. Convergent Technologies has its own product.

Epson offered a miniature version of a full computer system, with a keyboard, small display, narrow printer and tiny tape cassette all built in. The machine costs £411.

Kyocera has dropped the printer and tape unit; instead it offers a big display, with eight 40-character lines.

User memory starts at 8K and goes up to 32K. There are built-in interfaces for printers and storage peripherals. The machine runs Basic from the US firm Microsoft. This is supplied as a read-only memory. The processor is built around Intel's 8085 eight-bit CMOS processor. Prices start at £500.

General applications available initially include word processing, address book and diary. But the suppliers are talking to dealers and

software houses about package-specific industries.

"Executives will use it as a portable tool," said Gammeter, "but a portable product is not a portable market. It is a portable market with one application, insurance company, for example, might give one to each rep. program to handle quotations could sell thousands into our company this way."

Epson has had success in this type of market, with its firms developing industry packages. The company said there is a "vast number" of packageable applications.

Olivetti calls its machine M10 and fits it in at the heart of its M20, M30 and M40 line microcomputer range.

Convergent Technologies is odd firm out. It has gone single application with Workmate - spreadsheet, modelling - but also offers services such as a telephone, telex machine, dictating machine, alarm clock as standard for \$895.

The Workmate is not portable in the ordinary sense of applications which are data as rows and columns can be developed by users.

Convergent Technologies president Alan Michels took a risk the competition by saying businessmen did not write their letters using word processors, they did not need such packages. With Workmate they could get them into the machine in the way.

£850,000 helps 32-bit

by Caroline Burgess

OXFORD-BASED Hytec Microsystems has won £850,000 to develop a 32-bit microcomputer and an operating environment - a 16/32-bit operating system which will provide interfaces for communications and networking.

The investment comes from the sale of 15% of Hytec's equity to Newmarket (Venture Capital) for £450,000, a software development grant, and more money from its founders.

"Taking mainstream development and putting that sort of system on a micro," is how Chris Swinbank, one of Hytec's founders, described the project. The move straight from its present

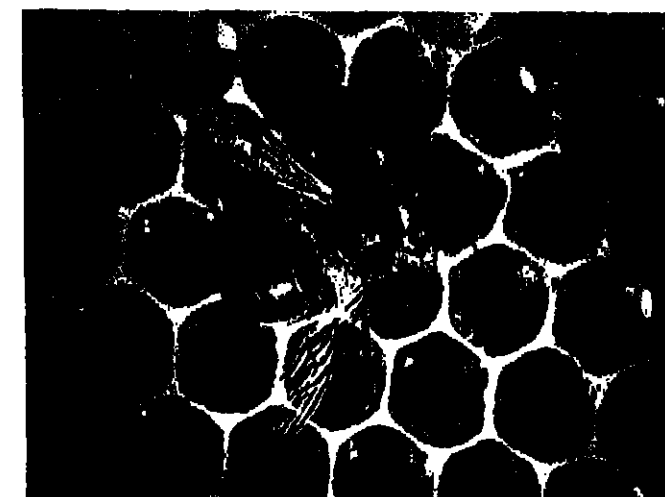
eight-bit Prelude to a 32-bit machine is a bid to break into mini and small mainframe markets.

Hytec see this market as a growth area of the future. "We don't want the current hype to end," said Swinbank. "The development of the new system, which may be as a joint project with Oxford University, is expected to be completed by 1985."

The software development support other 16/32 bit operating systems including CPM, DOS and Unix, as well as providing communication and networking facilities. Hytec expects its first stages to be implemented the next two months.

Micro News is compiled by Robert Pary

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Others will try to follow

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"If it can meet the technical requirements, it could open up a pretty wide market," says a spokesman for the British Robot Association (BRA). But the BRA stresses that success will depend on the machine being very reliable.

Approval will have to be sought from Osborne's US creditors before the UK company can get the manufacturing rights, but Healy said he did not anticipate any

A MAJOR planning conference for the information technology community is to be launched in February, 1984. Sponsored by Computer Weekly and the National Computing Centre in association with International Data Corporation, the confer-

"What I really want to do is to set up a package of private investment and government grants along the lines of that organised by ACT for the Apricot computer. ACT has 50% of its costs underwritten by government grants, which allows the company to price so attractively. I can't compete with that unless I get a similar package."

Although the capacity of the factory has yet to be decided Healy said he had no doubts about the demand for Osborne products in this country. "There is no problem on the demand side. There is a very strong market for our product. This is because we sell a no-frills, no-gimmicks product at a realistic price," he said.



by Keith Holder
DR NORMAN Schofield, former group technical director at Compeda, will head a new CAD/CAM consultancy unit for computer integrated engineering set up by PA Management Consultants.

Earlier this year there were rumors that Schofield and former Compeda managing director Keith Trickett were going to start their own CAD/CAM company. "We got to the stage of financial offers," says Schofield, "but around that time we were both offered positions with existing companies and found that the attraction was stronger." Trickett has recently

taken up an appointment in the US with Gerber Systems Technology as technical director.

Saffield will be responsible for acquisition and development of packages for plant engineering, electronics and production engineering. "To me, knowledge engineering will be the only significant initiative," he added. "It will provide rather an interesting twist to see CAD/CAM products coming from a consultancy background."

The unit will concentrate on three areas: straight consultancy for companies; tactical software written in house for both new and existing systems and strategic, man-

by Caroline Burgess

THE construction industry is not taking advantage of computers to keep costs down. Instead, it is being confused by the great variety of products available in a rapidly changing market, according to a survey by Building Centre Computers.

The survey has led to the formation of a permanent exhibition of computer developments relevant to the construction industry. It will be run as a commercial concern, by Building Centre Computers, offering free advice about computer systems.

Computers will release skilled and expensive personnel from necessary, but often mundane and time consuming tasks, enabling them to get on with building, designing or talking to clients," said Keith Kennedy, a director of Building Centre Computers.

Details of who will be showing products at the exhibition, due to open in November, have not yet been released. However, it will not be manned by salesmen from the exhibiting companies.

According to Kennedy an important part of the exhibition will be to remove the mystique surrounding computer technology. Therefore, staff from Building 200's Computers will work at the exhibition to give objective advice.

The exhibition will be staged at the Building Centre in London, a permanent headquarters for exhibitions of building products, run by an independent trust since 1952 and visited by 200,000 each year.

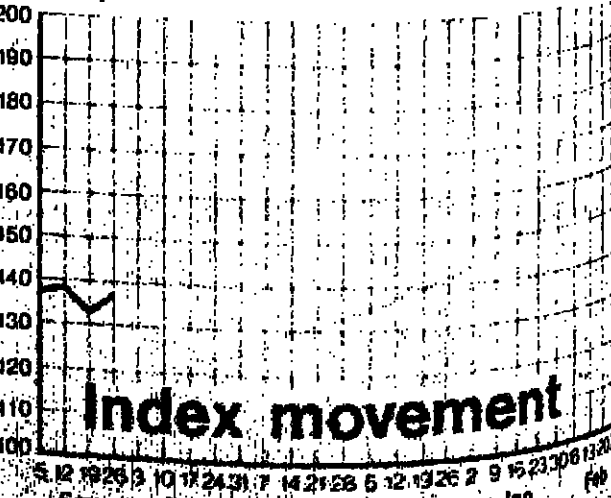
The project will be financed by charging the exhibitors and from commission from any sales resulting from advice given.

Building Centre Computers were formed a year ago by a chairman, chairman and a committee of 12.

The shares table, which is specially compiled for Computer World, selected computer companies that reflect the state of the computer industry.

[illegible]

The table shows the closing prices in London on Friday and in America on Thursday. The Index is based on the prices of the F.K. companies in the table. Highs and Lows are shown where necessary.



**The answer is software.
And software is Cullinet.**

PROFILE

A boss with the 'Buy British' bent

PETER HEAVEY does not pretend to be an innovator. His company Tribstar trols in the wake of Digital Equipment, making terminals compatible with the DEC VT100 terminal.

"We are living off crumbs from the rich man's table," Heavey admits. However he thinks his crumbs are the best.

He says he can offer a terminal that is a de luxe version of the VT100 while at the same time being cheaper. The latest offering is the TT102 plus, which incorporates features of an earlier VT100 look-alike with the addition of tilt and swivel of the screen. There is also an extra large 15in screen, and a choice of screen colour. The VT100 keyboard has been redesigned as well.

The TT100 was originally made

by Philip Hunter

by Trident Computer Services, better known as a supplier of contract programmers.

"I didn't wish to cease making and marketing this because it was alien to their business," says Heavey.

So in stepped Tribstar last February to negotiate a manufacturing, marketing and dealing licence. Tribstar still picks up royalties for TT100 sales.

Tribstar now builds the terminals at its factory in Milton Keynes and Heavey looks forward to moving into fresh pastures and severing the ties with Digital Equipment.

This will have to be done if the company is to maintain its growth, since there are 50 UK companies

making DEC-compatible terminals and it will only be a matter of time before others match the features of the TT102.

One possibility is to put more intelligence into the terminals, but there is no commitment yet. "We will wait and see how developments go," says Heavey. "We could put a micro together now if we wanted."

But plenty of other people are doing that too, and Heavey's more immediate concern is with DEC's next terminal, the VT200 range, already replacing the VT100 in the US.

Surprisingly Heavey has not yet started work on a VT200 compatible terminal, although he says he can move fast when it comes to the UK at the end of the year.

After that Heavey hopes to build terminals and monitors for other UK companies at his new factory.

He is keen to help the patriotic bent of his company, even though he is indirectly helping DEC sell its machines.

All the terminals are assembled in the UK. "Everything is bought from British companies; we don't import anything," he boasts.

The driver board, logic boards and some of the keyboards are still made overseas, although Heavey says Tribstar later this year will build the logic boards under licence.

Heavey's computer background includes nine years with Control Data, a company best known in the UK for its supercomputers, mainframes and the Plato computer-based training package. Less well known is that the US giant has for some years in the US had a business advisory service, set up to



HEAVEY... "Crumbs from the rich man's table."

help small young companies and as a corollary spread the Control Data net wider.

Heavey's last appointment with Control Data was with a UK subsidiary set up to model the business advisory service in the US.

This, explains Heavey, was based on a talent pool of external consultants available on request. "It provided the middle-aged senior executive with the opportunity to control the success of a smaller company."

There were three types of advisers: people with general business experience, more technical people who could help companies with their first computer purchase, for example, and Control Data staff who were allowed to be registered on the talent pool.

But Control Data had it all wrong, Heavey contends. "People in small businesses often know what to do and never do it."

So Heavey and his wife Beryl, who also worked for Control Data, left to set up their own company to assist small firms.

"Rather than tell them how to run their business, we simply take over the calculation of cash flows, overheads, sales and production levels," says Heavey.

This venture is still ticking over, but all the spare cash has been sunk in Tribstar, which Heavey says is set to turn over £1.5 million in this year ending July 1984.

"In the last two months, we have sold over 50 TT100s," he says.

PLATFORM

David Scaman is marketing manager of System Industries.

Customers should not put up with the waiting game

WHEN it comes to breach of promise, some computer companies have more to answer for than any run-away bachelor who left a jilted bride crying at the church.

For the insidious practice of announcing products which are due to arrive months or years ahead - and in some extreme cases never do - has bedevilled the computer industry for years.

Waiting for a product to appear from one of these companies can be like watching a pregnant elephant. It can be a very long wait before anything interesting happens.

We have now reached a position where the practice of announcing products so far in advance of their appearance is seriously damaging to computer users and suppliers.

Yet the marketing men of the computer industry used to think it was such a clever ploy, especially if you were one of the giants of the industry. As the argument ran, if you were a large company with a substantial user base and in-built customer loyalty, you could keep your customer hanging on in eager anticipation for months for your next product offering.

That ploy had the added and all important advantage of keeping those irritating plus computer manufacturers, who might not be able to offer your customers equipment which existed now, at bay.

But that thinking, which may have been clever ten or even five years ago, is fast changing. Computer users are much more sophisticated than ever before, and are rapidly getting wise to these ploys.

Many have had their fingers burnt by companies which promised products in a specific timescale but which appeared late - or even never at all - and to a different specification.

Even more important, we now live in a time when technology is changing faster than at any previous period in the computer industry's history. The personal computer market is possibly the extreme example of this.

The latest, state-of-the-art, whizz-bang machine is, one year later, as dated as yesterday's newspaper. New technology and new applications of new technology rapidly tumble upon each other.

In this environment of rapid change it no longer becomes a sound marketing plan to announce new equipment too far in advance.

After all, what kind of technology will a customer get from a product finally produced as much as two years after it was first announced? Will it be outside edge or inside edge technology?

The fact remains that no company can base a product on technology which does not exist, and it is simply not possible to be precise about the technology which will be available two years hence.

A company which now announces products so far in advance is not really exercising sound marketing judgment. It could so easily be a recipe for deteriorating customer relationships.

Two things tend to happen. First, as so often with long de-

velopment schedules, the programme slips. A 12-month cycle becomes 15 months, and finally 20. What happens the customer, waiting on hooks, while all this is going on?

Salesmen will be visiting rapidly, offering him plenty of excuses, and increasing lavishly to assume the manager because the product is not available.

When the product finally arrives, that customer will be less likely to excuse any problems than if the product had been delivered from stock at a brief waiting period.

He will, quite reasonably, view the fact that the manufacturer has taken so long to produce it, it damn well had better be right - or why the hold-up?

The message is one which a customer salesmen ought to have kept waiting a happy customer.

Moreover, this approach to selling can have a serious effect on the customer's development. If a product is promised late, a customer may postpone certain other projects in with that date. A delay therefore has a devastating effect on his organisation.

So what is a reasonable person to do? My view is that it is almost impossible to give a date to a product, and that should be to almost every kind of computer product, although some computer products will be more complex than others and will give considerably less notice.

For certain concepts which are announced, it takes a considerable time for products to appear. What is one example? Video disc is one example. There is a difference between announcing a general intention to produce an optical disc product and making a specific commitment to produce a product with a set of specifications.

What should a computer user do when he is approached by a supplier who promises a product way off in the future? The answer, I suppose, is to throw the door.

But probably some needs to be given to the supplier. First, if the product has a specification to a product which is already available on the market, what is the point in waiting for a new product to appear - unless it is going to be considerably more expensive, which is unlikely.

Secondly, if the manufacturer is offering a significantly more advanced product, how realistic is the time scale? How realistic is the most important, will the technology be in the product by the time it appears?

In the end, the responsibility lies in the hands of the customers. They should make clear to suppliers that they are prepared to put up with the promises of products which may or might not appear at an unspecified time in the future.

David Scaman

ComputerWeekly

Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Thursday, September 29, 1983

Will Edwardes get ICL manufacturing?

Q: WHEN is a surprise not a surprise?

A: When you should have seen it coming.

Last week's news that Sir Michael Edwardes was to succeed Sir Christopher Laidlaw as chairman of ICL came like the proverbial bolt from the blue. But were the signs there for all to see?

There appears to have been little doubt within ICL that Laidlaw was about to retire, despite official denials, the last of which came only 24 hours before the official confirmation of his departure. And although the company is understandably reticent about discussing details of how the board reached its decision to approach Edwardes, it appears that the ex-BL and Mercury boss was number one on a list of one.

One of the most important qualities which must have drawn ICL toward Edwardes is the high visibility of the man. If it is possible to criticise Laidlaw's chairmanship, it must be in this area - Robb Wilmot was the young, dynamic whizz-kid, while Laidlaw was overshadowed in the eyes of the general public, appearing rather conservative.

Edwardes, on the other hand, is a household name - a name which will undoubtedly attract many small investors, and those pension funds and other institutions.

But more interestingly, could the appointment of Edwardes herald the return of ICL to manufacturing as opposed to badge engineering? His background lies solidly in the manufacturing area - something which cannot be said of the current board.

ICL still has both the hardware and software expertise to design first division products, and there are many who would welcome the return of ICL to the manufacturing area. Edwardes would be just the man to do it.

Laidlaw steered the company through its traumatic financial problems of the last three years, but the time may now be right, and ICL stable enough, for a more adventurous approach to management.

In Wilmot and Edwardes, ICL has one of the best teams in UK industry - if not the best. It will never have a better chance to establish itself as a dominant force in world terms. There can be no excuse for failure.

No more heroes

THERE are no more computer heroes. That was the sad message from the programme chairman for IFIP's ninth world computer congress in Paris last week.

Dionysis Tschritzis, the man behind the five-day programme of more than 100 sessions, lamented the passing of the "old days". He reflected that the old days were akin to a classical orchestra, whereas the computer industry is now more like pop music - unknown kids in basements are creating computer programs that are having enormous effect.

Computer programming, he said, stretching his analogy even further, is more like pouring concrete - we no longer know who does it. And Tschritzis' obvious fear was that at the 10th world computer congress, to be held in Dublin in 1986, there would be new faces and new memories of the history of the computer industry.

It is always sad when a good party breaks up as the dawn comes. And Tschritzis should be allowed his nostalgia, for it has been an exciting time since IFIP, the International Federation for Information Processing, was founded nearly 25 years ago.

But he goes too far when he heralds the death of computer heroes. What he really laments is the ending of a tightly knit group which had enormous influence on the development of the industry. And he is also lamenting the waning influence of the large machine, supplanted as it has been in so many applications by the microprocessor.

If there were ever heroes in the computer industry, nothing has changed: Steve Job of Apple, Clive Sinclair, Chuck Peddle, Bill Gates of Microsoft and Gary Kildall of Digital Research might all have a claim to such an accolade. And that most wily of computer architects, Gene Amdahl, is not finished yet.

1984 and all that...

THIS week's example of the strange things people say about computers was sent in by J. A. McCurdie of Winsford, Cheshire, who wins £5.

She relies on her own observations: "He has an athletic figure and is very agile. Last week I found him four runs up a ladder. He says things like 'doggie', 'oh boy', and 'oh dear'. What he really needs now is a computer."

Sunday Times

LETTERS

Alvey director on the right track

YOUR interview with David Talbot, the Alvey Programme software engineering director, *Computer Weekly*, September 15, shows encouragingly that he at least is on the right track.

May I help him a little further along the way? As he says, it is not the amount of money invested, but the value we get out of the system that matters. This suggests immediately that what goes on between the two should be the subject of scrutiny. Too many times in the past have British ideas and inventions, often backed with substantial sums of money, been allowed to dissipate themselves in the general morass.

Talbot's observation that IBM did not capture the market with its PL1 compiler gives a further pointer. For IBM has since learned

that, mighty though it is, even it cannot be totally self-sufficient. It now buys in microprocessors and technology at one end, and at the other end sells through independent retailers.

Now other mainframe monopolies are following suit rapidly, and as busy shedding their xenophobia. This factor coupled with the enormous driving force of the micro sector is leading to the emergence of a highly structured industry, with individual firms becoming more specialised and restricting their activities to specific layers within the distribution chain.

The whole scene from chip manufacturer to the end user marketplace, must be viewed as an entity, which is as strong as the weakest link in the chain.

The general success of the Japanese is largely attributable to the close attention they give to ensuring that they have a complete structure for the industry concerned. In America the climate seems to favour healthy natural growth. However, in this country we must take action to create a rational and balanced structure within the industry as a whole, so that it provides a servo effect for investment, thereby creating the value for money that Talbot is looking for.

If Alvey can bring about a soundly structured British computer industry then they will have made a lasting contribution. If not any investment will be wasted.

R. J. R. REBBECK
James Ross Associates
Walton-on-Thames.

The CPM-86 and MS-DOS battle

YOUR article on 16-bit software (*Computer Weekly*, September 8) is puzzling. Is the great battle between CPM-86 and MS-DOS purely a media event, or can anyone join in?

Over 100 Sirius computer users in Edinburgh do not care two hoots about either of them, and have rejected the screen monitors

given away with their machines in favour of the ICLSD p-System.

The following article on Unix is extraordinarily dismissive of this operating system, not recognising that Unix and the p-System do not compete in the "personal" computer arena at all.

Are you genuinely ignorant, or are there something more sinister going on at your newspaper?
S. J. W. DRUITT
SIA Computer Services
Edinburgh

The Editor welcomes letters commenting on subjects published in *Computer Weekly*, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

Redundant authority

WAS there a hidden reason for the illustration to the article, Sept. 15, which showed a man in a London Town Hall not part of the London Borough of Merton?

Since they did not get a mention in the article the only reason I can think of is that it illustrates a typical local authority situation - redundant and scheduled to be demolished!

W. P. FEATHERSTONE
Technical Officer

Customer Computer Services
National Westminster Bank
London

Gem Equipment

GEM Computer Equipment of Chorley, Lancashire would like to make it clear that we are in no way connected with Gem Systems who were subject to a report (*Computer Weekly*, September 8). We totally specialise in the supply of new and refurbished computer forms handling equipment.

MIKE JACQUES
Gem Computer Equipment
Chorley.

DOWNTIME

Baffled boffins

IT'S a painful sight to see the world's computing intelligentsia totally baffled by a computer - but that is what happened at IFIP '83 in Paris last week.

Someone decided that space-age communications would be the thing to have, so the French PTT promptly stepped in to set up an electronic mailbox system for delegates, running on the Teletel videodata system. They even gave everyone a plastic card with their own secret mailbox code, and installed terminals all around the Palais des Congrès.

Seldom can technology have produced so little result for so much effort. Throughout the opening days, delegates could be seen scratching their heads and vainly stabbing at buttons.

Cries of "This system is not user-friendly!" were to be heard in a variety of accents.

Despite the fact that the official language of the meeting was English, most of the instructions were in French only. After much fumbling just to get the thing started, a user would find the machine telling him "TAPEZ (enter) SUITE". So he would press Suite, only to be told "TAPEZ

SUITE" again, and again, and again! Obviously the French were trying to demonstrate their profound grasp of recursion.

Your reporter succeeded in getting to the stage of typing in his secret code:

JYT71
and was told over and over it was "INVALIDABLE" (invalid). Hands up all of you who guessed that the character on the end was not a one, but an I!

"ILLGAL COUNTRY" (it should have been FRA). Then a delegate tried to send a message to Jean Carteron, chairman of the organising committee, and was told he did not exist. It seems that Carteron had never actually registered at the conference.

Much anguish was eventually ended when the system broke down altogether. Not before, however, the broadcasting service had come up with some real gems. A session chaired by the Soviet academician Andrei Brshov, entitled "Tough nuts in theoretical computer science", was advertised as NUTS IN THEORETICAL COMPUTER SCIENCE.

In the name of art

AS a diversion from their weighty deliberations, delegates at IFIP '83 had the chance to go to an evening reception at the Centre Pompidou to view a display of computer art.

It was interesting to get a close-up look at this celebrated latter-day palace of culture, and to admire how the architect had succeeded in disguising it as an oil refinery.

Mind you, I fear his intellectual integrity in refusing to cover up the mechanical parts of the structure seems to be backfiring: substantial patches of rust are now appearing on the framework.

Still, the delegates got to the top floor without anything collapsing and were rewarded with an impressive view of Paris and plenty of conviviality. There was an inexplicable mismatch, however, between the number of seats at the tables provided, which was just right for the number of guests, and the quantity of food, which ran out.

One would have thought that getting the two to correspond would not be mathematically very difficult.

And the computer art? With some effort one could see spaced around the walls various pictures,

Harmony

THE mind tends to wander during boring presentations, and there were plenty of those at IFIP. Sometimes the results can be serendipitous, though. One Dutchman, listening to endless talk about error-tolerance, came up with the idea "Why not build an error-tolerant musical instrument? Then it would not matter when I made mistakes in playing - the correct music would still come out."

Great idea, but with a few technical problems to be overcome, I fear. Perhaps it would be easier for the musicians to find some error-tolerant listeners.

A company which now announces products so far in advance is not really exercising sound marketing judgment. It could so easily be a recipe for deteriorating customer relationships.

Two things tend to happen. First, as so often with long de-



10 YEARS AGO

FROM *COMPUTER WEEKLY* OF SEPTEMBER 27, 1973: Computer Data's Call 378 time-sharing network became available to UK users via a transatlantic cable link... Lord George-Brown joined the ranks of Diebold Computer Leasing... Over 200 exhibitors and 10,000 visitors took part in the Business Efficiency Exhibitions at Olympia... The report on operating profits for the year of £32 million, 47% increase on previous year.

WORKPLACE

Survey shows sackings doubled in six months to April

The staff sale of the century

DEMAND for real time programmers in defence applications has rocketed in the present cold-war climate. But the employment situation in the industry generally is uncertain, and employers feel obliged to keep the staffing levels of their large data processing departments to a minimum.

In the latest survey by Computer Economics, a research company which twice a year polls 500 ITP departments employing 35,000 people, it is suggested that the number of sackings doubled in the six months from October to April 1983.

The significance of this figure is doubtful because the sample was small, but it is certain that some companies have trimmed their permanent staff. And the pick up in the contract recruitment market this spring suggests that some firms are reluctant to rush into taking people on permanently until they are sure the recession has finished.

The difficulty that less well-trained people have in finding permanent work in the computer industry was highlighted when 450 people were made redundant by the maker of printing and photo typesetting machines Linotype Paul.

Linotype got together with Inbuscon consultancy, which owns Laseco Software, in an attempt to sell the 450 people as a single workforce, offering a range of skills in hardware engineering, operation and production.

Sally, the venture has not yet proved successful. About 45 have been taken on by Inbuscon, which took over part of Linotype. And some others have found jobs elsewhere through their own efforts, but there are still 200 left to be found jobs for.

"I really am surprised and disappointed we have not made more headway," says Dennis Henry, who heads Inbuscon's interests in Scotland.

But Henry has had to contend with a surfeit of capacity in electronic assembly. He says he got worried when other electronics firms such as GEC, STC, Dragon and Osborne, announced redundancies. But he also says he has had some near misses.

The reply from the 1,000 companies mailed directly in the US, Japan and Europe usually began something like this: "We regret that we have no need for people at the time being..."

The 450 redundancies were announced in April, but have been put into effect in stages, and the 200 people that have not yet been placed are still on the Linotype payroll.

Linotype personnel manager Alan Robson says that these last 200 people will be made redundant by December; so a last ditch effort is being made to find them work in the Cheltenham area.

But, as the original idea was to sell the 450 people as one job lot, with a balanced range of electronic assembly and engineering skills, a slight change of tack is called for.

"We have to recognise that the thing we have to offer becomes more diluted," says Robson. He points out that, so far, nearly everyone who has actually been made redundant has found work, apart from those who aren't working because they are choosing not to.

Whatever the final outcome, few workforces can have had so much money spent trying to find them work. But Robson hints there is a limit to how much longer the effort can go on.

Today—a woman's place is on the board

IT remains to be seen how successful next year's Women into Science and Engineering (WISE) awareness campaign will be at bringing a healthier mix of the sexes into technical jobs. At present the more senior the position the less likely a woman is to be found occupying it.

But Philips Business Systems seems to have got the message, because it is sponsoring the 1983 Women Mean Business Award, along with Options magazine.

The winner will receive the handsome trophy shown in the picture, together with a well-earned fortnight's holiday in Jamaica, courtesy of the island's airline.

The burning question is: How successful have the two sponsors been at bringing women into key positions in their own companies? Options magazine has its hands clean, as it has at the helm editor Sally O'Sullivan. Philips Business Systems, however, candidly admits that women have not been very successful at finding their way into its top management.

The company has five directors, 10 general managers and about 45 managers. About five of the managers are women, but none of the general managers or directors is.

The company says that it does not discriminate in either direction, but it hopes that more women will come into top jobs, and points to its sponsorship of the business award as evidence of its intent.

Entry forms are in this October's edition of Options. Applicants receive a complicated questionnaire, which in last year's first competition (not sponsored by Philips), weeded out the feeblest

females from 4,000 entries. Applications close on November 30, after which six finalists will be chosen from a shortlist of 12, who will spend half a day explaining how they run their businesses.

Reg Parry, public affairs director for Philips Business Systems, says: "We are delighted to be sponsoring this award because it helps women achieve things that in today's business world."

Norwegian software for database holders

A THREAT to the dominance of dBase II in the market for database managers on personal computers has just emerged from a small Norwegian software company. Oslo-based Norsoft has released Vista, which unlike dBase II allows the user to store many different types of document in one file.

Douglas Gilbert, who wrote part of the package, says that it will be slightly upmarket of dBase II, selling for around £700 after its first exposure to the UK market at the Which Computer Show scheduled for next January.

The company claims that Vista, unlike dBase II, is a genuine database management system, as it does not have a file structure.

All information is stored in a single file under key words, which can be used for sorting.

Any combination of sort keys can be used on one single document, which also gives it a lead on rivals.

Vista has been bench tested against dBase II on a simple application to maintain the subscription register of a magazine. There were 1,221 individual records.

There was little difference on sort and search times, but Vista was much quicker on editing, taking only one second for one sample edit compared with over six minutes for dBase II.

This, of course, is an extreme case. But the most important thing about Vista is that it is easy to use, as dBase II has often been criticised for being hard to learn.

I tried Vista myself and found it delightfully easy to generate a simple database with. If dBase II is more complicated, the comparison should not be laboured at.

Vista is less powerful as a report generator than as a dBase creator and manager.

A one-user Vista system on two floppy disc drives can hold 1,500 to 2,000 records of a particular holding, says, details of a particular customer in a customer file would take between one and two seconds to retrieve a particular record, depending on the size of the file.

So far, 100 such systems have been sold in Norway. But Norsoft is working on a 16-bit four disc version, which will allow up to 10,000 records of one type or 30,000 records in total on one disc.

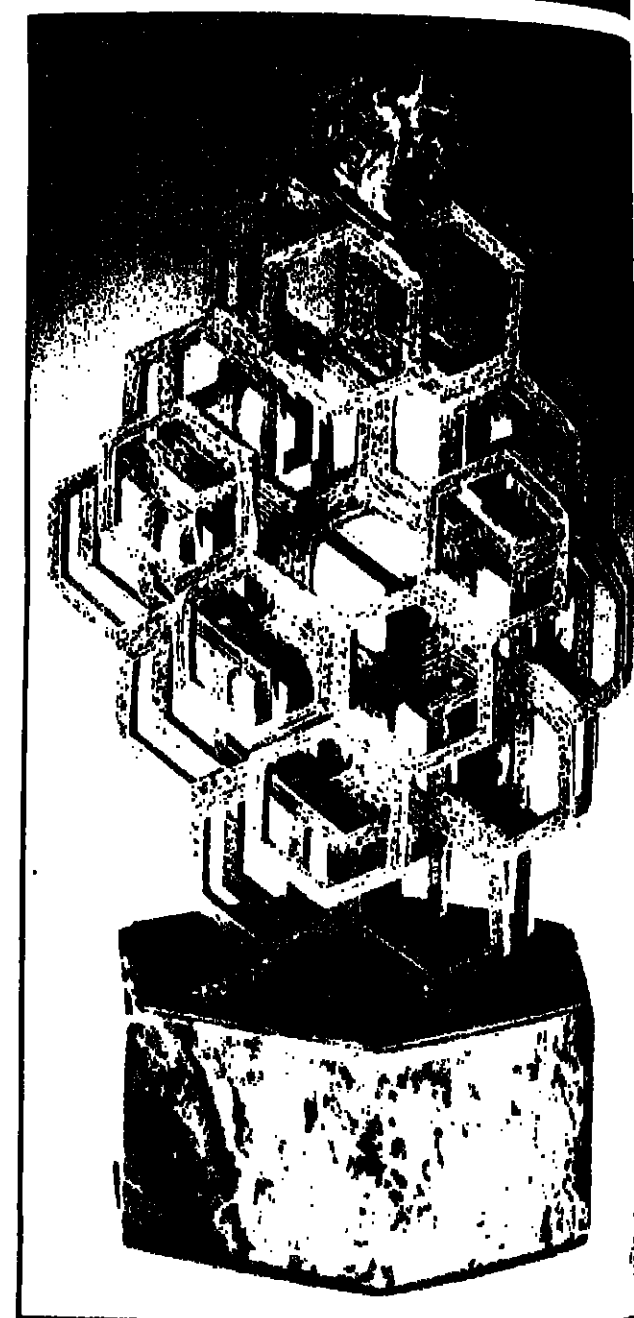
The company says that Vista, in hard disc version, speed is improved up to 10 times, and access times to less than a second by implementing enhancements.

C.P.M. In practice however, a customer who wants to handle more than 10,000 documents would be better off with a bigger system.

PUZZLER

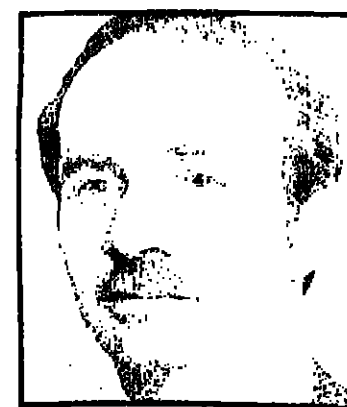
TWENTY FIVE TEN TEN TEN EIGHTY

If I tell you that TEN is not divisible by ten and that TEN is an alphabet, you should have difficulty in solving it. See page 10 for solution.



TROPHY... but are the sponsors' own houses in order?

PEOPLE



Lester C. Faircloth (above) of Arlington, Texas, has been appointed chief executive of Cable TV Construction, a UK consultancy and contractor to cable franchise applicants and cable operators. Previously vice-president of construction with Warner Amex Cable Communications, he was responsible for the building of cable TV systems in Dallas and Houston.

Christopher Singer has joined the Granada group as managing director of Granada Microcomputer Services which retails microcomputers through high-street business centres. The first outlet opened in Slough in April. Singer was formerly a director of Argon International.

Holman Hunt, managing director of PA Computers and Telecommunications (Pactel) has been reappointed to the Monopolies and Mergers Commission for a further three-year term. During his first term he served on such well-known references as the Central Electricity Generating Board, London House of Fraser and Anderson Strathclyde. He is currently a member of the group investigating the Civil Aviation Authority. He is a computer professional of some 25 years' standing and founded PA's computer activities in the UK in 1958.

Steve Lord has been appointed associate sales director for Kiasor Systems UK. He is a former Master after 16 years with IBM, where he served in a number of executive positions involved in technical developments and sales.

Law Data Systems, the Leeds-based computer software house which specialises in the development of debt collection systems and services for the legal profession, has appointed Mark Fletcher as marketing and sales director, and Andy Bamford as technical director. Fletcher has been involved in the marketing of computer systems since 1976 and will continue to control the sales development and marketing operations of the company throughout the country. Bamford joined Law Data Systems in 1978.



As part of its expansion programme following the merger with Molecular Computer, Multicomputer has announced the addition of four new senior personnel. John West (left) formerly operations manager for the CNC product range of Allen Bradley, has joined as operations manager responsible for all post-sales activities; Stuart Pole (second left) formerly with Honeywell's city branch, has joined as OEM sales manager; Rod Dimmock (right) previously with Nixdorf Computer, has joined as sales executive for OEM and distributor accounts; and David Cornwell (second right) formerly with Centre-File, has joined as sales executive, end-user sales.

DIARY

SEPTEMBER 29

Intel iAP432 specialist, High Integrity Systems, is to hold a one-day seminar at the Excelsior Hotel, Heathrow. Further details from Carolynne Jones. Tel: 0279-725030.

OCTOBER 3-7

Management for Operations Staff is a Compower Training School course at Cannock, Staffs. Cost is £465 including accommodation and all meals, but not VAT. Details from J. B. Dunning at the School. Tel: Cannock 2511.

OCTOBER 4

Man-Machine Interaction Programme is the theme of the British Computer Society Microcomputer Specialist Group first meeting of the 1983-84 session at Baden-Powell House, Kensington. 1.30pm. Cost £1.50. Details from Robin Phillips, secretary, 21 Rye Close, Saltdean, Brighton BN2 8PP.

OCTOBER 4-6

Programming Business Systems in Basic is an NCC course. London Training School. Cost is £365. More details from Course Administrator on 061-228 6333.

CONFERENCES

The fourth programme of Pergamon Infotech's Intensive Technology Development Series is to be presented during November and December. Nine events, covering each of the principal computing disciplines, and lasting from two to five days, are included. All are to be held in London and fees range from £280 to £460 + VAT. Further information from Pergamon-Infotech.

OCTOBER 10-11

Wang (UK) is holding four half-day seminars covering office automation and word processing. Fairfield Hall, Croydon. More details from Sara Perry on 01-621 1010, ext. 272.

OCTOBER 12

Seventh annual symposium on computer applications in medical care. BCS Medical Group, Baltimore Convention Centre, Baltimore, Maryland, US. Details from Dr Virginia Saba, Nurse Consultant, Division of Nursing, Bureau of Health Professions, 3700 East-West Highway, Room 3-50 Hyattsville, Maryland 20782.

OCTOBER 15, 17

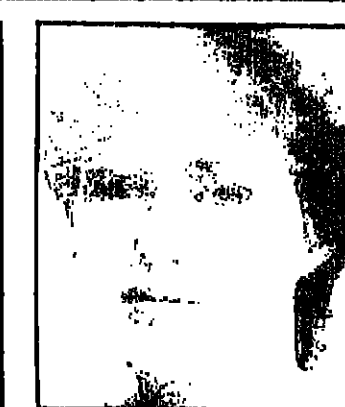
Data Protection is a one-day course in London on November 15 and in Liverpool on November 17. Instructor, Joseph Kenny. Details from Keith London Associates, 07073-30114.

NOVEMBER 4, 5, 6

Brainwaves, the consumer show for users of home computers, home video and home electronics. National Exhibition Centre, Birmingham. Details Clapp and Poljak on 01-747 3131.



Philippa Edmunds (left) and Anna McManus have joined Package Programs Ltd, the financial application package supplier. Edmunds, PPL's new administration manager, previously worked in Australia for Software International, and prior to that organised client training for Comshare in London. McManus, who has joined PPL as a marketing assistant, spent three years with IBM in the application and technical support groups.



Computer Technology has appointed James Bowie and Phil Stevens as senior sales executives for the Ministry of Defence and British Telecom accounts respectively. Both will be based at CTL's recently opened offices in Hemel Hempstead. They joined CTL in 1982 and 1981 respectively.

Jeremy Allen has been appointed vice-president of US operations by Panorama Office Systems. He joins Panorama from Letraset where he was a main board director and subsequently director of development and marketing.

Data General has appointed Philip A. Dowley as manager, Scotland. He has been with Data General for four years as a senior sales representative, based in Glasgow, and covering the North of Scotland. Prior to that, he spent four years with Rediffon.

Martin Lester has joined MRS Microtext as a software support consultant. Previously he was with Olympia Business Machines as a micro software consultant. He carries held technical support positions with Surrey Typewriters and Philips Data Systems.

At Nashua, supplier of copper equipment and removable systems, Frank Skinner, formerly UK sales and marketing manager, has been appointed European general manager, marketing with overall responsibility for European distributors, OEMs and developing new business opportunities, and Jim Stevenson assumes the role of UK sales distribution and marketing manager. Skinner joined Nashua in 1973 from IBM. Stevenson joined Nashua from Honeywell seven years ago.



New field sales manager at Digital Microsystems is electronics engineering graduate Eddie Wernmuk who will be responsible for both dealer liaison and the development of sales to large corporations, public utilities and educational establishments in the North of England and Scotland. Wernmuk joined Extel Engineering as an account executive in January 1980, and moved to DMS also part of the Extel Group, when it was formed in September 1982.

Altos Computer Systems announces the appointment of Alan Mawdsley as OEM sales manager responsible for spearheading a major Altos marketing drive into the OEM market, and large end-user accounts. He joins from Oceanic, where he was sales manager, responsible for the company's Scientific and Technical Division.

ADP Hotel Services, supplier of computer services to the hotel industry, has appointed Russell Kett as marketing manager. Kett was a consultant with Horwath & Horwath (UK) for six years, specialising in accounting control and management reporting systems.

Isn't it about time you stopped giving away all your best ideas?

The trouble with being a dBASE II programmer is that the highest reward you get for effort is glory. Now that's very good for your ego, but it doesn't do much for your pocket.

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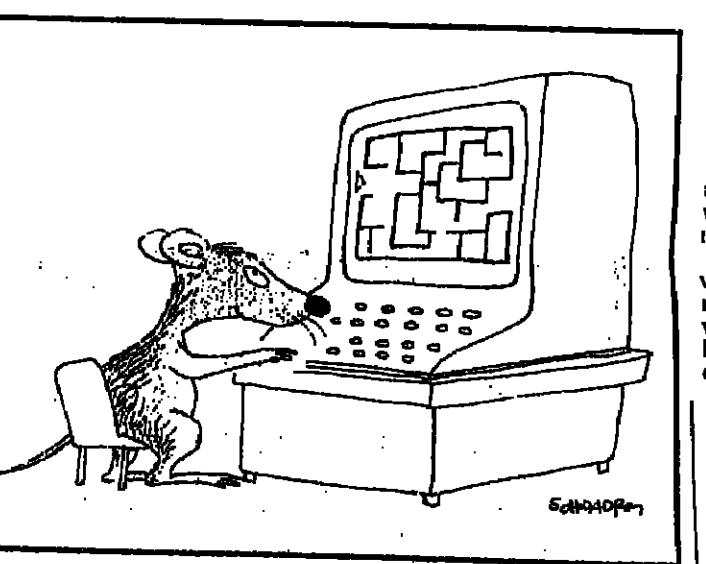


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ACCIDENTS... computers can pinpoint the black spots.

County cuts crashes

THIS campaign against road accidents is being boosted in one home county by a computer program that has identified the main causes of and trends revealed by 10,000 accidents. Hertfordshire County Council has built the biggest UK database covering road accidents, on a Prime minicomputer.

Every accident in the county during the past two years has been recorded, with each of 99 possible contributory factors, such as bald tyres or driving too close to the car in front. A program was written to prepare statistics for a report that has just been submitted to the county's highways subcommittee.

One purpose of the program is to locate accident black spots and pinpoint main contributory

hazards, such as poor streetlighting, concealed junctions, and traffic lanes converging.

The program has been used to evaluate the effect on accidents of small maintenance jobs, such as filling in pot holes. Team leader for accident prevention at the council, Tug Wilson, says that accidents have been reduced by 26%.

He adds that computer analysis has revealed that cutbacks on road maintenance, resulting from the drop in rate support grant from the government has taken its toll on the roads.

The program has revealed that bad tyres were a contributory factor to more than twice as many accidents in 1982 than in 1981.

Workplace is compiled by Philip Hunter

Let's be more realistic about Japan's fifth generation project...

Progress in creating a fifth generation computer is less advanced than some people imagine. Development of a suitable language lags behind and many hard choices have yet to be made, says Hedley Voysey

ENGINEERING developments reveal fundamental transitions in their history in an interesting way. Portable power is a great idea, but changes in popularity between jet engines, diesel engines and conventional petrol engines affect other streams of engineering developments. The ramifications ripple away to change the way crude oil is refined, as well as a host of transport design systems using portable power plants.

In computing developments, transitions have roots in physical materials and their processes. The limitations on speed for computers depend on the reaction time of circuits (not the simple speed of light limitations) and this pushes along the urge to increase the density of logic packed on to a chip.

However, if power demands are too high, then there are sharp limits to this process. The search for low power designs then becomes the critical choice factor in the process of designing the hardware base for computing.

However, this physical base for computing engines is complemented by a powerful notational base. The way that the hardware designers look at more complex assemblies of processing elements is limited by the power of their descriptive tools, whether these are graphical languages, or languages closer to conventional programming formats.

There is also a need for notations and languages to support the implementation of procedures and specifications being executed on processors capable of working in parallel.

As the whole thrust of shifting the spread of artificial intelligence (AI) achievements into everyday practice depends on lavishing logical processing power on these methods, there is a hunger for

massively powerful parallel machines.

The reasoning behind the Japanese belief in the existence of a fifth generation of complete concepts in computing stemmed from their assessment that a sharp transition in the notational (or programming language) base was necessary.

Their idea was to mesh the developments in hardware and software, so that they kept in step with each other.

If this reasoning is correct, then the choices being made in the programming language field by the Japanese may be crucial to their success in maintaining the coherence of their plan.

The original span of 10 years to make the major transition to a new generation has now been subdivided into three phases — the first runs for three years and the second for four years — leaving three years to put the act together.

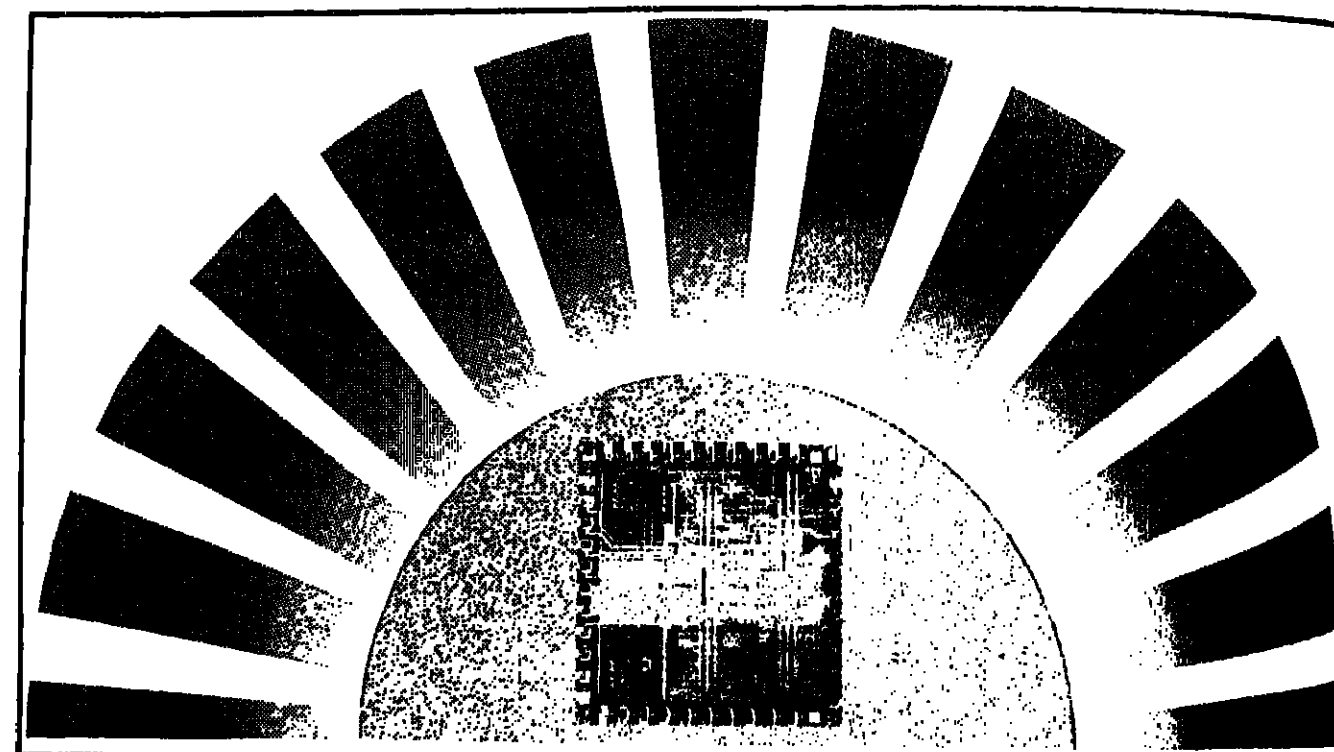
Although the view of the Institute for New Generation for Computer Technology (ICOT) are of Japanese when making critical choices in computer architectures, the truth is more subtle.

Nevertheless, it is ICOT which has set out its plan clearly, so it acts as a yardstick for other groups, both in Japan and in the rest of the world, to choose to measure themselves against.

ICOT has established eight sectors of work, which range all the way from studies of "inference functions" down to designing in very large scale integration (VLSI), using artificial intelligence techniques.

A powerful case for the coherence of the Japanese set of choices as made by ICOT was put forward recently by Shunichi Uchida.

The actual construction of test



beds of the selected couple of computer architectures does not start until the 1985/86 period. Therefore, the evaluation of performance and feasibility made then will be a time when the project will either gather pace or be subject to some critical reassessment.

The two basic mechanisms to be tried out are an inference mechanism and a knowledge base mechanism. The putting together of these two to form the prototype of the fifth generation computer is not planned to be done until the final phase of the project, which is due to start in 1989.

The Japanese choice for the kernel programming language has been "logic" programming, based on the Horn clause version of predicate calculus ideas. The strong link, due to the underlying use of predicate calculus, between this style of specifying actions and the relational database view of knowledge is the twine which binds the two streams of studies in

The choices being made in the programming language field by the Japanese may be crucial to their success

Japan together so that knowledge base development does not stray away from the inference mechanism.

At the Prolog language already exists to support logic programming, the Japanese regard this as a starting point. An entire group of the ICOT staff of about 40 people, however, is devoted to kernel language developments. They are aware that developments in logic programming are absolutely essential — especially for some problems in artificial intelligence.

The key point to emerge from Uchida's presentation (which apparently surprised some US delegates to the Stockholm meeting in June) was that very little is fixed in the Japanese plan for the fifth generation.

The machine design studies range across dataflow machines, as pioneered at the Massachusetts Institute of Technology, to reduction machines as pioneered by the West Germans.

Uchida is blunt in expressing the view that the language developments are well behind what is

needed to develop hard and fast architectures for a fully parallel inferencing machine in the later 1980s.

As the researchers have to work on something, they are getting a fairly primitive sounding Personal Sequential Inference (PSI) computer.

The PSI is a 40-bit machine, which may be thought of as a 32-bit engine with the addition of an eight-bit tag. The memory size is to range from four to 16 million words of 40 bits, and it should run Prolog about as fast as some of the existing machines in universities.

One of the priorities is to get a faster version of Prolog up and running. The raw speed of this PSI cannot be very great, as the micro instruction cycle is not much less than 200 nanoseconds, with a mere 64 bits of width for each micro order.

Although the Japanese are as interested as everyone else in trying for some extra power by developing "extremely long instructions" for microcode, there are no plans as yet to boost the PSI that way.

One of the more immediate tasks is to extend Prolog to enable it to be used for systems programming. The studies to find a fully parallel language are much more long term, as is the parallel version of the inferencing computer.

All the detail given by Uchida on studies on designing a fully parallel inferencing machine indicates that most of the large or hard choices are a long way from being made yet.

That is hardly surprising, but it adds a dash of reality to some of the wilder sorts of story being touted about the Japanese work at ICOT and the eight manufacturers tied into the fifth generation project.

Work at the Musashino Laboratory of Nippon Telegraph and Telephone (NTT) shows how much the Japanese are hedging their bets about "languages of the future". These NTT researchers use a simple Lisp based machine (comparable to the US original Lisp machine), which uses a 32-bit machine, although eight-bits are again absorbed for tags.

The NTT workers believe that Prolog does not provide a suitable style of expression for every situation. Their approach is to allow types of variable in the "two language, so that users can choose to

be compatible with either Lisp or Prolog.

They have also turned towards object-oriented programming, represented by languages such as Small-Talk, by allowing message passing, plus some interesting ways of classifying messages.

What the NTT researchers have spotted is the same sore point that Uchida stressed. We need to evolve programming description tools (both the languages as a set of features and as a reflection of the underlying model for computation) to suit both the experience of programmers and the variety of problems they are required to solve.

Oddly enough, the Japanese way of approaching things is closer to the UK way of developing this line of research than is commonly supposed.

Phil Treleven of Newcastle University presented a paper at the Stockholm meeting on the choices to be made in building highly

Phil Treleven stressed the need to keep one foot in the past experience of computing, while searching for a toe-hold in more highly parallel ways of describing programs

parallel machines. He said that the Japanese emphasised the discontinuity between current styles of computing and the fifth generation aims in computing, based on logic programming.

However, the evidence is gradually beginning to pile up from Japanese papers that most of the critical choices still have to be made. The NTT's work alone shows that distinguished groups of Japanese computer technologists are in no hurry to be herded into a prison formed by the constraints of current versions of Logic as a programming language.

Furthermore, they are prepared to adapt existing beloved tools, such as Lisp, to make them even more amenable to programmers familiar with conventional control flow programming languages.

Treleven stressed the need to keep one foot in the past experience of computing while searching for a toe-hold in more highly parallel ways of describing programs. The Japanese seem to be stressing the urgency of exploring the parallel world of computing, but footnotes to their re-

search show that they, too, are aware of the need to conserve successes in design.

The same evolutionary line of the Japanese emerged in a workshop at Edinburgh University covering developments in low power consuming VLSI which basically concentrated on complementary metal oxide semiconductor (CMOS) progress.

As Professor Jonathan Allen of the Massachusetts Institute of Technology said: "The market for gallium arsenide chips will move very fast to keep up with the best work being done in CMOS."

The Japanese representatives from Toshiba and Nippon Hamamatsu concurred. Both the US and the Japanese were inspired by achievements presented by

To everyone's surprise, the Japanese were also impressed by the success of the UK's collaborative venture in exploiting CMOS build up to 5,000 gate arrays

chip. The aim here is a 100% turnaround.

The fabrication is being done by British Telecom and there are other major organisations, including the Science and Engineering Research Council, involved.

After about 18 months, the chips are being evaluated as a target of achieving a design in a week or two of start-up.

Gate arrays are so far on the leading edge of technology that Japanese were expected to be bored by hearing this. Their reaction was to be amazed by the achievement enabled designs to evolve beyond simulation and this was a significant point.

They were naturally interested in the latest 8088 chip processor — the 8088 which is aimed at the Occam language. Occam is an enable practical parallelism to be explored in multiple processors ganged together.

The Japanese thought the "quite outstanding" because of help to evolution.

Leader of the pack... the new Qume QVT range of video terminals from BYTECH



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... they're hedging their bets

DATA STORAGE

Stick by what you know works...

... because keeping pace with technology is not for the faint-hearted, reports Keith Holder

THE demand for storage peripherals continues to grow, according to one report from Freeman Associates, which predicts a growth rate of 23% over the period 1982-87.

Keeping pace with this demand in terms of technological improvements is not for the faint-hearted, particularly as recent developments with both floppy discs and optical storage systems threaten to change the face of the storage market. As with any fiercely fought technology battle the race to get a system into production is conducted at breakneck speed and often leads to a state of similar "breakthroughs" hitting the marketplace simultaneously.

Yet for all the advances there still remains a market for the older technologies and systems which, if nothing else, represent a known quantity for performance.

Oldest by far is the magnetic tape which, though superseded in performance, remains popular with a lot of users. IBM found this out to its cost when it launched an all-data-online campaign to motivate users to change to disc storage.

The campaign was a dismal failure attributed to the huge investment many users have in tapes and their satisfaction with tape performance. Another cause was the failure of IBM and plug compatible rivals to deliver mass storage disc systems such as the 3380 on time.

Improvements in tape capacity and reliability have also been impressive, reaching a maximum density of 6,250 bits an inch and speeds of 200 in a second. Improved production techniques have also yielded lower error and loss rates through better control of odder particle voids and tape distortion.

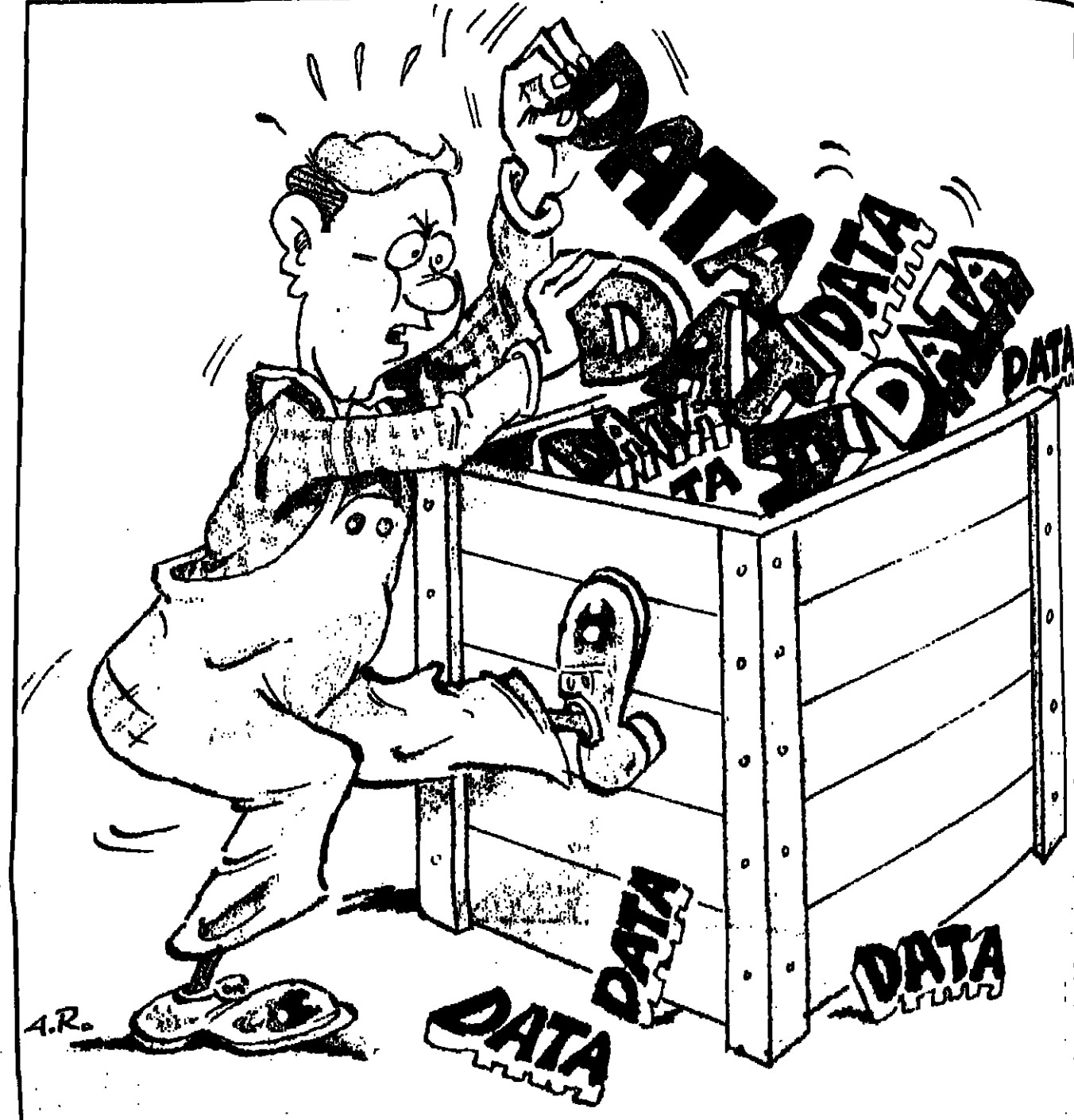
The floppy disc is, and will probably remain, the fastest growing area of storage technology but, partly because of this, users are now faced with a bewildering choice of different sizes, capacities and so-called standards. The capacity offered by these devices has risen sharply. Drivotec's 320 "supermini-floppy" already offers 3.3 Mbytes on a 5 1/4 in disc and Amlyn plans to release a 6.4 Mbyte 5 1/4 in drive by the end of the year.

Progress has taken two forms, firstly with improvements to the disc media itself resulting in higher track densities (196 tracks per inch) and storage capacity. Secondly, in order to make use of these disc developments, drives have undergone several refinements to allow better track following, taking into account environmental changes in the disc material, and positive centring of the disc.

The high density discs, currently available from a number of manufacturers, including BASF, Dysan, Memorex and 3M, use iron oxide particles impregnated with cobalt in coating thicknesses around one micron to achieve the necessary performance.

But however good these discs are they will always distort under the effects of temperature and humidity and the success of these systems is largely due to manufacturers' efforts in servo tracking systems which allow the read/write head to compensate.

This type of closed loop drive has been achieved in a number of ways though the basic method is similar in all cases. The servo receives information from a reference track located outside the data storage tracks which continually updates the positioning of the head. Drivotec's system, for example, does this by comparing two signals from adjacent tracks and, via a microprocessor, alters the positioning of the head until the signals are equal.



improve contact between disc and head. The addition of hub reinforcement rings and refinements to clamping devices in drives has led to better control over disc centring.

Aside from the purely technical considerations there has been a growth in the number of disc sizes. Eight and 5 1/4 in discs are still the most popular, but the last three years have seen a growth in the three, 3 1/4 and 3 1/2 in camps. The performance of these smaller drives is comparable with their larger counterparts.

Tabor, for example, has a 3 1/4 in device which holds 500 Kbytes using 140 track per in discs. A three inch drive is available from Hitachi, Hitachi Maxell and Mat-

The consensus is that great things are afoot but it may be worth sticking with what you know will work today

shita, which uses a hard shell disc. In the battle for standards on the sub 5 1/4 in market many companies are looking to IBM to provide a lead and some are keeping their options open until IBM makes its move, as the plug-compatible market will certainly provide huge potential sales.

While many of the manufacturers have made their sub 5 1/4 in offerings compatible with the larger drives the IBM 3 1/2 in drive is not.

Development of eight inch drives by comparison has been virtually non-existent. The sole exception to this is the Omega Alpha-10 which uses a special track medium to allow about 200 tracks an inch, enabling it to store 100 Mbytes on a single disc. This is not only a disc device but offers a mere 192Mbytes storage. The company says it is offering this lower capacity to allow users greater flexibility, particularly if IBM tops supporting the 2305 drive. Another reason given for not pursuing high capacity was that the coming optical disc systems will take care of the market niche and Storage Technology said it may announce a low-cost offering at the end of 1983.

Sticking with discs, the Winchester drive has established itself very comfortably in the high capacity

market though the shortcomings of these systems remain. The fact that an ultra-clean environment is needed for the disc to head area places limitations on reliability (one particle of cigarette smoke is enough to cause damage) and because the discs are not as easily transportable as floppy, or indeed optical, discs they will face continuing pressure as their once unmatched performance is equalled by other media.

Perhaps the greatest challenge to the Winchester will come from optical disc storage devices. Erasable discs are already developed and around 10 major manufacturers are at an advanced stage with prototypes and customer trials well in hand.

The Japanese company Matsushita has already announced an erasable disc and Hitachi, working with Hitachi Maxell, has announced a range of discs and controllers capable of storing 1,310Mbytes on a single side of one disc. Those eager to try this technology will still have about six months to wait for deliveries for Hitachi.

The pressure to develop these systems in Japan has come from the desire to improve document handling and library filing using their 4,000 character Kanji alphabet. This would be an ideal application for this technology as images and diagrams are easily stored.

Although the Japanese appear to have a temporary lead in this technology, they are not likely to keep it long. Philips, in partnership with Control Data, has a similar system at the customer trials stage and spokesmen for these companies say they are confident of a launch date early in 1984. The

Philips disc is said to be capable of storing around 200Mbytes on a single disc.

3M and NEC both plan to launch systems ready for delivery next year and a partnership between Xerox and the French company Thomson CSF is said to be well advanced.

Although these devices are being launched initially as savers a report from Japan, which analysed the potential market for this technology in the US, says that as costs come down the thing it expects to happen soon after a number of optical disc systems such as the IBM 3380 become more cost effective magnetic storage media.

The benefits from this technology also make it easier to see why the discs will be as rugged, yet, because they are by a laser beam, do not suffer wear. It is with this idea in mind that Storage Technology is competing with existing hard disc systems such as the IBM 3380. The user thinking about a storage device to add to a system faced with this and other optical disc developments for image systems but it may be worth thinking back to the Winchester drive.

Even so, the range of systems even of the same type, is enormous and despite predictions that the marketplace for storage technology is expanding some technical advice caution about changing systems.

The consensus, sticking with what you know will work today, is that great things are afoot but it may be worth sticking with what you know will work today.

DATA STORAGE

Why secondary storage costs are increasing in significance

But, as Owen Hanson writes, the choice is not a simple one and is not becoming any easier

AS THE cost of main storage and of CPUs moves relentlessly down, the relative cost of secondary storage — discs, tapes and mass storage devices — grows even more significant. For discs, we are constantly told that the cost of storage per byte is far lower than it used to be.

This is true, but it is still catching up the cost of mainframes, and in applications such as banking and insurance it has already become the largest part of hardware costs. For example, a 236 gigabyte 3850 costs more than a 3083 CPU with 16 Mbytes of main storage. At a lower level, a 4331 L2 CPU, with four Mbytes of main storage, costs less than a string of four 3775s with a disc controller.

More than three years ago, IBM launched its all-data-online campaign to move users from tape to disc storage. The campaign was not successful, partly because of the huge investment many users have in tapes; the satisfactory performance of those tapes and their users' intention to go on buying and using tapes.

The campaign also failed because IBM and its competitors did not deliver 3380s and their look-alikes on time. Now these delivery problems have been overcome, users could switch entirely to direct access storage, but, this would not generally be cost-effective, as most installations still have a lot of sequential files in use for which tape storage is highly satisfactory. Recent surveys by Rekha Patel and S. M. Woo of the City University showed that between 80 and 90% of users have sequential files in operation at the present time.

One user has been able to keep both hard and soft errors on tape down to a maximum of one hard and three soft errors in three months. Given this level of performance, it cannot be said that tapes are unreliable, although not every user can compete with this success rate. To do so, it is necessary to log every error on a tape, and use tape certifier and tester devices to ensure that tapes are operating correctly and to identify lengths of tape that are causing problems. But, with this level of

care, there should be no problems with tapes.

Despite the virtues of tapes for high hit-rate sequential files, the main problems users experience with direct access devices are inherent in the devices. Large numbers of hard discs are available for microcomputer systems, but they are not well suited to business needs.

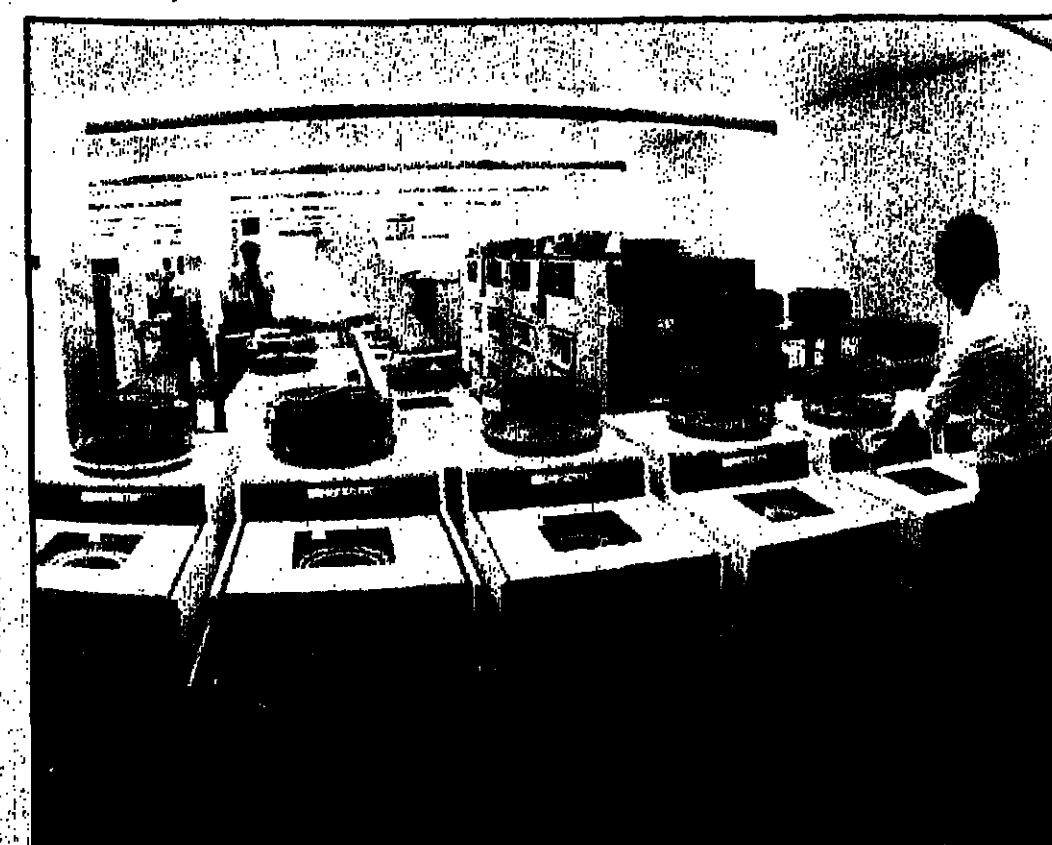
Backup provision often relies entirely on floppy discs, with 10-30 such discs needed to copy the whole of the hard disc for security purposes.

Many systems rely on cartridge tapes, which are relatively slow and far less reliable than the device they are backing up (as are the floppies).

Only a few units offer the option of a removable disc to back up the fixed part of the unit. The best known of these are CDC's 9454/9455 Lark, an eight inch unit with an unformatted capacity of 8 + 8 Mbytes; DMA System's Micro-Magnum, which is a 5.25in., 6.75 Mbyte unit; and the

How many users have bought the big new discs, believing that their problems would be solved only to find they were not

New World Computer 5.25in. unit of four Mbyte + a two or four Mbyte removable cartridge. Eventually, of course, all hard disc manufacturers will be driven in this direction, and many users feel that the sooner the better.



A row of Control Data disc drives.

Device	2311	2314	3330-1	3330-11	3350	3380
Date	1964	1967	1970	1973	1977	1981
Capacity (MB)	7	28	100	200	317.5	630
Transfer rate (BPS)	156K	312K	806K	806K	1.7M	3M
Average access time (ms) (including head movement and rotational delay)	87.5	72.5	38.3	38.3	33.3	24.3

Table 1: Access time of discs

Device	STC 4305	Intel Fast 3805
Access time (ms)	0.3	0.4
Capacity	11.25-90	11.2-72
Transfer rate (BPS)	1 M, 1.5 M or 3.0 M	1.5 to 4 M
Compatibility	2305	2305, 3350

Table 2: Semiconductor access time

Device	Braegon 7110	IBM 3850	CDC 38500	Massstor M860
Capacity	808 to 7808	35,000Mbyte	16,000Mbyte	55,000Mbyte
Range	reels	472,000Mbyte min max	1,000,000Mbyte min max	440,000Mbyte min max
	144,360Mbyte min 1,405,440Mbyte max			
Data access time (seconds)	15-20 to mount only	8-13 range	7.5 average	7.4 average

Table 3: Massive storage devices

There has been a very great increase in capacity per access head, and in data transfer rate, over the last decade. This has not been matched by the modest improvements in average access time achieved over the same period. Table 1 gives typical values for these three essential measures of disc performance.

Since the advent of the 2311 in 1964, the value of data swept by a single access head has increased 90 times and data transfer rate has improved almost 20 times. By comparison, the average access time (for a full disc) has only been reduced 3 1/2 times, and even since the advent of the 3330 it has only come down from 38.3 to 24.3 milliseconds.

The comparison is not altogether fair, however, because if file sizes had stayed the same a far higher proportion of a file would

be under the access heads at one time than in the past. But file sizes have increased, so the figures show a serious weakness. And, because of the advent of virtual storage systems, page datasets, which are much smaller than the capacity of modern devices, are so active that all other datasets on the same huge volume are virtually unusable.

It is fashionable to say that the speed of modern equipment is so great that there is no need to be careful with data file or system design. For disc files that have never been less true. Huge capacities inevitably lead to head contention, as most users know to their cost. How many users have bought the big new discs, believing that their problems would be solved, only to find they were not? If the manufacturers knew, they are not saying.

A better method of disc design would have been to increase enormously the number of channels and access mechanisms, keeping the capacity of data storage swept by a single access mechanism to a minimum. Manufacturers went the wrong way, but all is not lost, because of the advent of disc cache and semiconductor disc storage.

Semiconductor disc storage, with an access time seven times that of fixed-head discs, and about 100 times that of the 3380, first appeared in 1978/9. Table 2 shows figures for the STC 4305 and the Intel Fast 3805 storage devices.

These devices can be used either to handle operating systems and page datasets files, or for larger file storage as front-end processors. Although they are not being used by many companies, those users who have them seem very satisfied with their reliability and performance and point to marked improvements in performance.

The second alternative is disc cache storage, aimed at front-ending a disc string. IBM offers the 3880.11 disc control unit, with eight 'Mbytes' of semiconductor storage that can be used with 3350s to handle paging data, and the 3880.13, which can have four or eight Mbytes of cache storage to handle application file data on 3380s.

Although there is a small benefit for direct applications, the greatest



Inside the 3850 mass storage system.

benefit for the 3880.13 is in handling sequentially accessed files, as a large part of the file can be transferred to cache and processed in its entirety before being returned to disc.

Where there is a genuine need for massive direct storage, a number of devices is available (see Table 3). These devices do not compete with discs for speed, but they are much more useful in, for example, insurance or banking, to store records that are seldom accessed, but must be available to answer the occasional query.

Given the present choice of data storage devices, there is no easy way to handle every situation. For backup or high hit-rate sequential files, tape is still worth considering. For massive direct access storage, a mass storage device is unavoidable.

In between, the need for change may be due to a lack of separate data paths when many files are active at one time; the need for very fast response when data is being rapidly paged in and out; or the need for very rapid transfer rate when skip-sequential processing of files is possible.

The choice is not a simple one, and it has not been made easier by the direction recent disc design decisions have gone.

STC offers a more complex arrangement with its 3390 Syber-cache. Typically, it provided multiple paths to the data and allows the user to choose between using cache for sequential access only, for all access, or for none. STC claims that sequential access time can be reduced by 40-75%, and direct access time by up to 35%.

As manufacturers of discs have made the mistake of providing

very large, non-removable disc volumes to their customers, semiconductor cache as a front-end to disc strings will become more and more common. But this trend should be reversed. It is not true that backups can be organised fully satisfactorily without removable discs or tapes.

Where there is a genuine need for massive direct storage, a number of devices is available (see Table 3). These devices do not compete with discs for speed, but they are much more useful in, for example, insurance or banking, to store records that are seldom accessed, but must be available to answer the occasional query.

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The choice is not a simple one, and it has not been made easier by the direction recent disc design decisions have gone.

Owen Hanson is director of the Centre for Business Systems Analysis, the City University, London.

DATA STORAGE

More and more people are finding their way into storage

John Aczel finds that UK production of storage units is growing and sales are increasing

	Jan- June 1983 £000	Jan- June 1982 £000
Belgium-Luxembourg	1,965	839
Canada	741	448
Denmark	1,536	1,346
France	4,061	1,246
Germany (West)	29,517	11,481
Ireland	1,397	807
Italy	2,147	1,563
Japan	10,318	2,266
Netherlands	4,743	4,927
Portugal	4,445	3,446
South Africa	170	253
Sweden	468	169
Switzerland	227	N/A
US	57,651	44,641

Table 1 - British imports of disc storage units by main suppliers (by value)

	Jan- June 1983 £000	Jan- June 1982 £000
Belgium-Luxembourg	911	464
Canada	219	147
Denmark	80	20
France	698	1,094
Germany (West)	57	21
Italy	658	-
Japan	568	495
Netherlands	43	33
Norway	75	11
South Africa	2,018	2,165
Spain	307	865
Taiwan	16,536	10,652
US	16,536	10,652

Table 2 - British imports of magnetic tape storage units by main suppliers (by value)

	Jan- June 1983 No.	Jan- June 1982 No.
Belgium-Luxembourg	446	498
Canada	503	372
Denmark	162	109
France	3,108	2,427
Germany (West)	17,511	6,403
Ireland	3,019	803
Italy	2,298	2,166
Japan	93,216	10,502
Netherlands	11,862	11,882
Portugal	1,318	1,230
South Africa	78	143
Sweden	518	382
Switzerland	4,752	77
US	96,263	41,485

Table 3 - British imports of magnetic disc storage units by main suppliers (by number)

	Jan- June 1983 No.	Jan- June 1982 No.
Belgium-Luxembourg	1,196	169
Canada	16	4
Denmark	39	62
France	16,122	6,236
Germany (West)	17,511	6,403
Ireland	3,019	803
Italy	2,298	2,166
Japan	93,216	10,502
Netherlands	11,862	11,882
Portugal	1,318	1,230
South Africa	78	143
Sweden	518	382
Switzerland	4,752	77
US	96,263	41,485

Table 4 - British imports of magnetic tape storage units by main suppliers (by number)

	Jan- June 1983 £000	Jan- June 1982 £000
Australia	82	74
Belgium-Luxembourg	1,062	450
Canada	55	126
France	6,166	4,429
Germany (West)	9,614	6,922
Ireland	3,430	1,055
Italy	5,479	4,137
Japan	6,416	4,409
Netherlands	1,773	594
Sweden	1,341	613
Switzerland	1,059	715
US	7,791	2,462

Table 5 - British imports of disc storage units by main suppliers (by value)

SALES of storage units in Britain have continued to grow rapidly and demand has gone up faster than expected. Imports have been buoyant and have captured a bigger share of the overall market.

Up-to-date information about the level of demand for storage units is not easily available and there are big gaps in the official statistics. But it is possible to estimate the size of the market by collecting various statistics, particularly those on imports, exports and production.

There are two main sectors of the market - disc storage and magnetic tape equipment - but the former is the more important. For both products, the market in 1982 was between £200 and £250 million at manufacturers' prices. This estimate is subject to revision as more information becomes available, and it does not include distribution costs or wholesale and retail margins.

According to some analysts, the value of the storage unit market is rising by about 40 to 50% a year, as a result of the rise in demand for various types of computer, especially micros.

Most of Britain's requirements for storage equipment are satisfied by imports but there has been a steady increase in production in the UK. Official figures show that production of storage equipment rose to about £75 million in 1982, against £70 million in 1981. For the first quarter of 1983 the figure was £20 million, continuing the upward trend.

During 1983, UK production should continue to rise and the full year figure could be 10% higher than in 1982, at about £80 to £85 million, with most of this being disc storage units.

Much of this output is being exported, with sales abroad amounting to nearly £60 million in 1982. Some of this may represent re-exported products, mainly from the US, but, if these figures are correct, they suggest that 80% of the UK throughput is now being sold abroad.

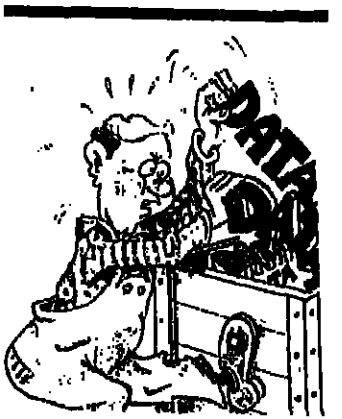
Home production is insufficient to meet the requirements of the fast expanding British market, so imports have been capturing a bigger share; and for some products, this was about 90% of total sales. Competition in the computer storage market has been tough and

prices have been coming down rapidly. In the first half of 1983, the average price of an imported disc storage unit dropped to around £500, as against £1,000 a year earlier. Magnetic tapes have also been dropping in price - at about 20% a year.

These prices are port-of-entry prices. The price to the user includes retail and wholesale margins, and distribution costs. Nevertheless, the trend has been sharply downward, even though sterling has been weak against many other currencies. Foreign suppliers have been willing to drop their prices in sterling terms to secure higher volumes for their products, even though that has meant lower margins, after taking into account currency fluctuations.

British imports of disc storage units went up to £121 million in the first half of 1983 - a rise of 60% over the same period of 1982. For 1983 as a whole, it is expected that deliveries will be worth about £250 million, as against £160 million in 1982.

The rise in imports by volume



UK production should continue to rise and the full 1983 figure could be 10% higher than 1982

has been even sharper and, for some products, it has trebled in real terms. Thus, 240,000 disc storage units came into the UK during the first half of 1983 as against 167,000 units for the whole of 1982.

This sector has been dominated

by US producers and sales by the US doubled to 96,000 units during the first half of 1983. This represented 40% of all deliveries into the British market, but a strong challenge has been coming from Japanese suppliers.

Sales by Japan increased fivefold to over £10 million; in volume they rose tenfold to over 90,000 units. Japanese products were at the cheaper end of the market, especially their microcomputers, but competition has been heating up in all areas.

Continental sales of disc storage units have remained at a fairly low level, though the Netherlands, Germany and Switzerland have been active in the British market. Deliveries by West Germany rose in volume to over 17,000 units, while those from Switzerland went up to nearly 5,000 units.

The imports of magnetic tapes has also gone up rapidly, though the volume of these imports has been considerably smaller than for disc storage equipment. Imports of magnetic tape products reached £23 million in the first half of 1983, which was 43% more than in the same period of 1982. For 1983 as a whole, it is estimated that imports will be in the region of £45 million.

By volume, 100,000 magnetic tape units came into the UK in the first half of 1983 - almost double the figure for the same period in 1982. The average price of these units has gone down markedly to about £220 a unit, as against around £300 a year earlier.

In terms of volume, Japan and the US were neck and neck, with imports of around 20,000 units from each in the first half of 1983. By value, however, US suppliers were well ahead, with over 70% of the total.

In addition, very cheap magnetic storage tape units have come from Taiwan in great quantities, amounting to over 200,000 units in the first half of 1983.

Exports of storage units have been rising, though at a slower rate than imports. Disc storage units exports went up to £42 million in the first half of 1983 - a rise of 70% over the first half of 1982. It is estimated that for 1983 as a whole the total will be about £90 million.

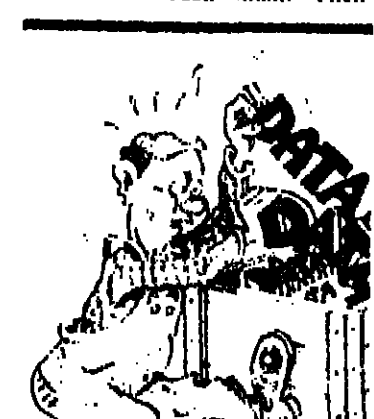
In volume, exports of disc sto-

rage equipment have been rising faster - they may have nearly trebled in volume. Nearly 38,000 units were sold abroad, at prices drastically cut because of strong competition.

The top markets for British disc storage units have been some of the countries on the continent, particularly those in the Common Market. UK deliveries to France reached £6.2 million in the first six months of 1983, which was up by 40%, while those to West Germany went up by a similar percentage to £9.6 million. A significant trade has been developing with some of the smaller European countries, including the Netherlands, Switzerland and the Scandinavian countries.

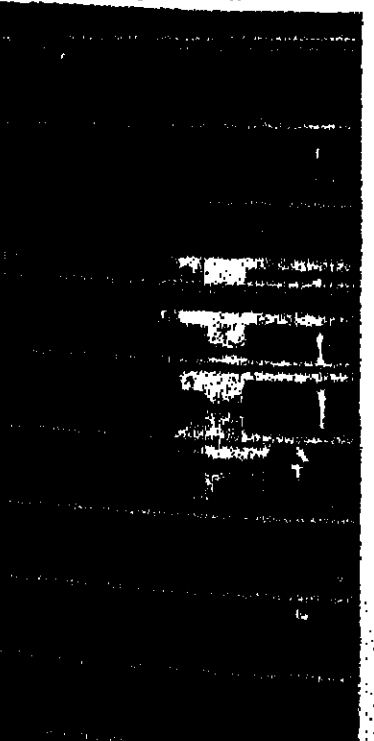
British exports to the US have been making good progress and have benefited from the strength of the dollar. Sales to the US more than trebled in value to £7.8 million. During the first half of 1983, over 11,000 units were sold abroad.

For magnetic tape units, sales abroad have been small. Their



Foreign suppliers have been willing to drop their prices in sterling terms to secure higher volumes

value was only £3.7 million in the first six months of 1983, compared with £1.9 million in the corresponding period in 1982. By volume, about 2,200 magnetic tape units were sold abroad, the major markets being in France, the Netherlands, Spain and the US.



DATA STORAGE



Manufacturers have got new technology taped

Derick Bostock reveals that tape technology has evolved to a very high level

INCREASING tape speeds and recording density require a tape with very good performance qualities, so that vital information is not lost due to oxide particle voids, tape distortion, etc.

Half-inch tape has been around since the beginning of the computer revolution and has had to keep pace with the new demands on its performance - for tape drives of many different designs, servo mechanisms, error detection systems, etc.

Tape is used for data storage, archiving, continuous processing, streamer back-up for disc systems and for the marketing of software. In all these applications, the basic requirements are the same - a mechanically stable and long-lasting base and consistent, error-free electrical performance.

Several recording techniques are used in tape transport systems, giving various storage densities. The non-return to zero 1 (NRZ1) format was used on early transports and is still popular, giving densities of 200, 556 and 800 bits/in and using nine tracks to read and write eight-bit data words, plus one parity bit.

Tape speeds of up to 75 in/sec are possible with this method but not higher because it cannot com-

pensate for tape speed variations. Self-clocking methods were introduced to overcome drive inconsistencies, relying on the change of flux polarity in order to identify level 0 or 1.

Each of the nine tracks on this phase encoded (PE) type of recording allows track clock signal recording, plus the data, and a flux change rate of 3,200 in allows 1,600 bits/in recording density.

The highest now generally available is 6,250 bits/in, with the group encoding recording (GER) method, which uses a similar technique to NRZ1, except that data is written in a format that guarantees a flux change in every three-bit cell.

Tape speeds of up to 200 in/sec are now used in some tape systems. This, combined with high track densities, makes it

essential to specify a tape that will withstand the mechanical stress of repeated stopping and starting and maintain a faultless performance. In addition, at these higher speeds friction between the tape and the brass components becomes significant, although a certain degree of friction is necessary between the tape and the rubber components and between the oxide and backing surfaces to ensure smooth tape

handling and cinch-free fast wind. Therefore, friction against brass is quoted as a maximum figure, while friction against rubber and the tape backing is quoted as a minimum.

Tape technology has evolved to a point where magnetic tape is available to meet these very tight specifications and provide long-term reliability and consistency even under extreme environmental conditions. To meet all needs a tape manufacturer must have full

control of production, from buying the raw materials to testing the final product.

To this end, some companies make all their media in-house, instead of buying in the coated rolls. This allows all stages of production, from the manufacture of the base and its oxide coating to the final testing and certification to be watched closely.

This expertise has led Wabash to produce its Quadronix computer tape, for tape drives up to 6,250 bits/in. (The name derives from

the four-way test procedure used. Each reel is tested individually to ensure data integrity at two signal thresholds for consistent quality on all tape drives. The tape is constructed from an oriented polyethylene terephthalate (polyester) base of 0.00142 in nominal thickness, with a 0.0003 in magnetic coating.

Specifications for curvature, cupping, yield force, surface resistance, etc. are quoted for five years under normal working conditions.

Data integrity and security is paramount, for expensive exploration programs cannot be re-run if information is lost due to tape error. In this situation, the tape must be totally reliable when used with all kinds of tape drive and remain intact in physical conditions ranging from below zero to desert temperatures.

In addition, where marine oceanographic work is undertaken, the tape must withstand corrosive salt-water atmospheres. The large amounts of highly valuable data must be reliably stored.

New developments in tape technology meet requirements for high densities and high tape speeds -

materials before and after manufacture, and with the testing of physical parameters such as tape width conformity, using optical comparators and certification microscopes.

The greatest demands are made on computer tape when it is used in extreme environmental conditions. For example, as a result of a request from its customers, Wabash has developed a tape for geophysical exploration computer systems, which are used throughout the world in extremes of heat and cold.

One type uses an oxide formulation, which is inherently smoother and cleaner than conventional tape surfaces. Frictional drag figures include a coating-to-brass specification of only 130gm maximum, backing-to-backing of 80gm. The coating gives enhanced performance with fast drives and high density recording formats, such as 6,250 bits/in.

This is a good example of the technological progress being made in magnetic tape performance. Tape will continue to be one of the major data storage media for the foreseeable future, with its many advantages, including high storage density per cubic measure, reliability and relatively low cost.

Derick Bostock is manager, Operations Division, Wabash Data Tech International.

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Things are looking up in the storage world - demand is growing for both disc and tapes

Coated strips shown in the process of being split into tapes which are reeled up individually.

How to make some massive savings

Paul Walton considers a compromise technology invented by IBM

MASS storage is a compromise technology invented and first sold by IBM. Masstor recently became the first vendor to offer competition to it.

Mass storage subsystems, to give them their full title, reduce the access time for retrieving information from very large (often hundreds of gigabyte) magnetic tape systems. They are a compromise between the cheap, but slow and cumbersome magnetic tape and the expensive but faster disc drive.

IBM has been selling its 3850 mass storage subsystem for seven years and has notched up a base of no more than 750 in Europe,

according to the recent Frost and Sullivan report, *The IBM market in Europe*. Masstor announced its M860 mass storage subsystem last year and has been making steady progress on the larger IBM sites.

Murray Langton is in charge of an evaluation of the IBM and Masstor storage systems for the University of London's computer centre. He told *Computer Weekly* about the two radically different approaches: IBM uses its 3850 as a sophisticated back-up for existing discs, while Masstor uses magnetic tape and bypasses the need for discs.

Langton's computer centre is the scientific bureau for universi-

ties in the south of England. Manchester handles those in the north. Both centres store an enormous amount of information on behalf of clients. Manchester has already taken a Masstor M860.

The London computer centre does number crunching for those elected users on an Amdahl V8, which front ends the main Cray-1 central processor. As a result it is packed with disc drives. The Centre also holds about 10,000 magnetic tapes on behalf of its users, most of which are only used intermittently.

Langton has two storage problems. The first is that, because of high cost and lack of space, he cannot buy more disc drives to provide the increased storage needs. So he has to increase the number of magnetic tapes used to archive information. Even with strict rationing, these tapes proliferate. If the information held on them is to be accessible some form of automatic tape access is needed.

Commercial sites have much the same problem, which most overcome by more rigorous archiving or by bearing the cost of disc drives: witness dependant users awaiting greater capacity IBM discs during the storage famine of 1981-1982.

Brian Burch, vice-president of Masstor, pointed out the need for some form of intermediate storage medium in a paper he gave to the IBM User Show earlier this year. He said that most organisations have three types of data to store: high activity files accessed frequently and best stored on discs; large and infrequently accessed files best stored on tape for loading when needed; and an intermediate set of files, eg a test file which is active for weeks and then not used for several weeks.

According to Burch: "There is a distribution of file types in any organisation - some used a lot, some not at all. But the bulk are of the intermediate type."

"What most users do is to cut that distribution of files down the middle. On one side they buy expensive discs; on the other side they buy tape, which is used manually. Storage then becomes an economic

decision based on cost. People end up spending more on storage than they should.

"They end up paying a premium for the fast access disc, which they don't really need. If you wanted to use a file which hadn't been touched for three weeks and you were in no hurry, then a one second access time is a waste of money."

Burch added that it was hard to educate users that mass storage, whoever they buy it from, is ideal for this intermediate storage of the bulk of their files. He said that this would cut a third off the price of their disc storage, with access time only slightly slower, at 10-20 seconds.

Langton agreed that most files are intermediate ones, and stressed the cost of operator intervention (tracking down and then loading the magnetic tape by hand) or the cost and space problem of adding discs. Files archived on tape might never be seen again, he said. They were effectively forgotten or lost.

Mass storage subsystems address this need. They are boxes consisting of several hundred cartridges, each with a 70ft long, 2in wide strip of magnetic tape coiled inside. Information is stored on the tape, which is automatically accessed by a central arm (for Masstor) or trolley (for IBM).

Langton has just ended an exhaustive review of his centre's data storage needs, and IBM and Masstor have submitted tenders to win his business. He says that mass storage subsystems are cheaper than disc in every respect, and faster than magnetic tape.

The University of London is looking for a 100 gigabyte system, which will cost about £500,000. Equivalent discs would cost a half to a third more, and there would be delivery problems for high capacity models.

Reducing overheads, such as operator intervention, is not the only aim. Access time is important too. The mass storage subsystems each take around 10-20 seconds from a request for information to getting the first piece of it through, said Langton. This compares with 40-50 milliseconds for a set of disc



Inside Masstor's mass storage subsystem.

drives holding the same amount of data, and the unknown time of finding and loading magnetic tape.

Space is becoming expensive, as the number of disc drives, or special peripherals increases, and often it is not possible to rearrange the configuration. Mass storage subsystems are several times smaller than the discs or tapes they replace.

IBM's 3850 is 20ft long, 4ft wide and to 5ft high but expanding the storage capacity can be difficult. Langton explained that, as IBM uses a small trolley, which has to run backwards and forwards in a straight line between the cartridges, expansion can only be in one direction. Adding 50 gigabyte extensions to the basic 100 gigabyte model can expand it from one wall to the other, curtailing further expansion.

The Masstor M860 (which uses the same cartridges as the IBM 3850), is 11ft long and 3ft wide and can grow in any direction. Like IBM's machine, the basic 100 gigabyte model expands 50% at a time but, because its cartridges are accessed by a more flexible arm inside a tub, it can grow upwards and outwards.

IBM has advantages over Masstor because it sells a complete package of hardware and software, which can use intermediate faster discs to design more evenly balanced systems. The 3850 was built to work with 3330 IBM discs (and their upgrades). Masstor's M860 is a direct tape storage system, which needs third party software to work with disc drives.

IBM treats the 3850 as if it were a set of virtual or temporarily used 3330 discs. The central processor calling for information reacts as if the 3850 were simply a slow disc drive. Masstor treats the M860 as virtual magnetic tapes, each of which are listed in a directory and accessed directly by the processor.

While it is possible to use the 3850 simply as a magnetic tape store, most users buy the additional hierarchical store manager (HSM) program so they can use it with discs. This utility moves any file on disc which has not been accessed for some time over to what it thinks is a virtual disc - the 3850 cartridge tape. When the file is again requested it comes back to a fast disc in anticipation of regular use and the need for rapid access.

But there are drawbacks with HSM. There must be enough real disc drive storage available to store all the real and active files, whereas they are being held. Once the number of files entered reaches the

real storage limit outside of a 3850's virtual extension, data occurs - ie the HSM must create space on the disc drive by constantly moving files between it and the mass store.

IBM developed the 3850 storage system as an aid to its operation, usually under a multiple virtual storage (MVS) operating system. It manages a problem of storing files needed intermittently by creating a virtual disc storage space for up to-day operations. Langton claims that it is not intended to expand storage you haven't got.

Masstor supplies a virtual magnetic tape system, and third party software is needed to work at faster intermediate disc rates. The idea, said Langton, is to automate the handling of one virtual tape drive, with automatic mounting of the one you want to retrieve information from.

The M860 comes complete with the store management task (SMT) software, which is used to direct access the virtual tapes on a half of the central processor. IBM Masstor is being sold predominantly to IBM MVS users, it is possible to extend its use to non-big machines by writing the interface software. (The M860 can be accessed by Control Data Honeywell, Sperry and Digital Equipment machines.)

The M860's main advantage is that working directly with magnetic tape is very much slower than having intermediate faster disc drives.

Mass storage subsystems are several times smaller than the discs or tapes they replace

IBM's use of virtual tape techniques means that requests for information can be processed through the fast discs and IBM software.

Langton has begun looking, however, at third party software which will allow the Masstor M860 to use fast discs.

Mass storage subsystems are existing technology, compared with rapid access of a disc drive. It is possible to compete to IBM and the increasing demand for data storage could result in their becoming popular after a quiet start, particularly if their prices come down.

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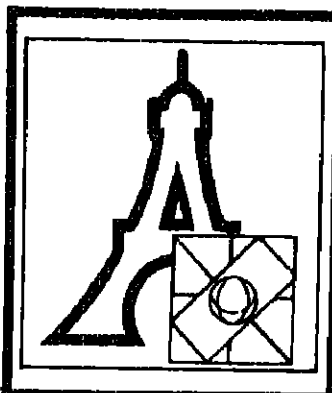


BURCH... Users cut distribution of files down middle.



LANGTON... His problem of high cost and lack of space.

IFIP REPORT



Full compatibility is closer

by John Riley
WORLDWIDE compatible computer communications took another stride towards reality last week, when standards bodies ISO and CCITT announced the extent of their collaboration. As a result, both bodies are bracing themselves for increased opposition.

Over the past five years both ISO (International Standards Organisation) and CCITT (Consultative Committee of International Telephone and Telegraph) have been working increasingly closely to draw up the seven layer open systems interconnection model (OSI).

Tom Steel, of AT & T Systems, who is responsible for CCITT's user interface standards, announced at IFIP that both were of virtually single minds now and outlined the future programme.

He foresees problems ahead within the industry and from academic circles: "I realise that it is frustrating for engineers to take part in the standardisation programme. Standardisation means freedom to do things as you'd like, and when working towards a collective design, I agree that some compromise is necessary."

Professor Tooru Moto-Oka, of

mal methods. Formal methods, dataflow design, VLSI architecture, logic programming, networks and communications, logic programming, database design and the social implications of computers made up just a few of the over 100 sessions attended by the more than 2,000 delegates at IFIP '83.

The conference, held once every three years, brings together an intimidating array of university boffins and research and development people from deep in the bowels of the world's computer companies to exchange ideas.

work. Whether it is perfect or not isn't the issue. The question is whether it is workable and acceptable to the vast majority to accomplish what they want to do.

Steel said: "OSI is a human construct, and is a rational way to

The debate is often convoluted, sometimes boring, and seemingly far removed from the day to day life of the data processor.

But among the delegates were those who will lead us into the next generation of computing. IFIP, the International Federation for Information Processing, now has 43 nations as full members, with a permanent secretariat in Geneva, Switzerland. Last week IFIP returned to Paris, where it held its first world computer congress. John Riley and David Craver report.



AMDAHL... Using "new" methods.

Amdahl is talking about his chip

GENE Amdahl confirmed that he is talking to most of the major computer manufacturers about licensing of his radical new chip design for large computers. With licensing agreements with Sperry, DEC, and Compaq Computers, Amdahl, who designed the IBM 360, built under his belt, further deals can be expected in the near future.

If big machines drive technological advance in computers, Gene Amdahl is the man to listen to.

And Gene Amdahl's address to IFIP's Ninth World Computer Congress had the larger of the conference halls at Paris' Palais des Congrès packed to its wings. Amdahl, who designed the IBM 360, was coy about giving further details of the machine which will emerge from his new company, Trilogy.

But he said enough to whet the appetite of at least one IBM research and development man, who probed for further details on the Trilogy chip design.

Asked what redundancy methods Amdahl would use to get high yields on his wafer-level integrated chip, Amdahl would only say he was using "new" methods - "but I am not going to explain them yet."

Amdahl said the design architect-

ture for the Trilogy machine was completed, and was now undergoing simulation. Wafer scale integration has been built, and works, he said. Speeds will be 30% faster than the fastest commercial scale systems now available, he promised.

Amdahl said the new system would be ultra reliable, with 40 years the meantime between failure of chips, and a four year meantime failure for the computer system, excluding peripherals.

The problem with the chilled water cooled system is not cooling, but the amount of power taken in and out, he said.

The architecture of the system is entirely new, with deep pipelines to a maximum of 64 instructions. Amdahl is sticking with mid 1985 as the date for first deliveries of the system, in spite of industry doubts. He promised a price performance below that which any of the plug compatible manufacturers could offer, and below that of IBM's promised new machine, the Sierra.

Amdahl confirmed that he is pressing ahead with his plans to go public with Trilogy in mid-October. He was off to meet potential European investors in Trilogy as soon as he finished his address.

Expert systems are in danger of being expert

THE dangers of viewing expert systems as really "expert", rather than as a helping tool, was put time and again by speakers.

"We are in trouble because of the terminology selected for this field; it was not done for clarity, but to get research and development money," said Kristian Nygaard, from Oslo University.

Many of the claims for expert systems, or artificial intelligence, have been widely exaggerated. In spite of this, he said, expert systems will be produced and used on a growing scale.

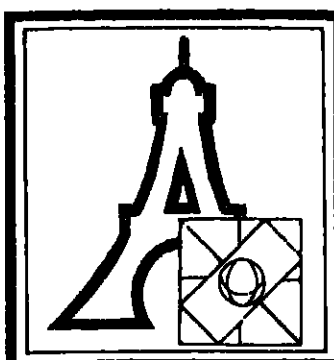
The US, for example, has "exactly 200 people" who are qualified to develop expert systems. The result, Nygaard said, is that there will be a large number of extremely busy expert systems.

Reinforcing Nygaard's comments, Niels Bjørn-Andersen, of

the University of Copenhagen said that concepts of artificial intelligence will "enforce a logic model on an ambiguous world", and in doing ignore what value precision cannot be differentiated or evolved in artificial intelligence; the real danger is of a one-dimensional thought process.

Most expert systems to date have been designed with a conscious aim of knowledge. "How accurate," asked Les Gasser, professor of computer science at UCLA, "do we assess the legitimacy of our body of knowledge over another body of knowledge over another body of knowledge?" Gasser cited as an example the medical practices of a hospital to treat the whole patient rather than just the symptoms.

IFIP REPORT



by John Riley
"C" is rapidly becoming the most popular programming language for language processing projects in Japan. That was a consistent message from the IFIP'83 conference.

Toshiba uses C extensively in its Japanese language translation system and in its forthcoming voice activated wordprocessor; and NEC Corporation's VLSI microprocessor strategy for the 1980s incorporates a C oriented instruction set.

"C is very popular in Japan because it is very powerful at memory handling and is a compact language," explained Dr Kenichi Mori, manager of the Information Systems Laboratory at Toshiba's R & D centre in Kawasaki. "It needs less memory than, for example, Lisp, which is very memory hungry."

C hits a high note in Japan

Mori delivered a paper which illustrated how Toshiba is applying artificial intelligence to office automation to help users communicate with computers.

Mori, a specialist in pattern recognition and artificial intelligence, and the inventor of the Japanese Post Office's postal code sorter, outlined the philosophy now underlying Japanese computer design.

"The first objective for future design is not to enhance the machine's efficiency but to enhance human efficiency - to make machines more human oriented so that everyone can use them," he said.

"For humans to communicate they have to share a certain amount of common knowledge, and the amount relates to the degree of understanding they achieve," he continued. "It is the same for man-machine interfacing

for an information system the machine has to have some store of human knowledge, even if very small, and has to accept human communication."

The structure of the written and spoken Japanese language has been the impetus for rapid developments in the application of that philosophy to man-machine interfacing in Japan.

Written communication is slow, as the Kanji character set has over 3,000 characters in daily use, compared with our basic alphabet of 26. A simplified Kana character set with about 50 letters exists, but does not produce easily understandable Japanese sentences.

That situation made typing slower than handwriting, thereby providing a considerable incentive to producing an efficient computerised translation system. In 1974 Toshiba launched its Kana to Kanji translation system which

stores word knowledge (it has a 30,000 word dictionary) and grammatical knowledge, allowing rapid written communication, at 120 characters a minute.

Since then, Mori explained, Toshiba has built in that foundation, and is shortly to announce a voice activated word processor. The Japanese language is much less complicated than European languages for this, as it has only 101 different syllables and each corresponds to a unique Kana character.

The new system stores word and syntax knowledge, recognition knowledge, and acoustic/phonetic knowledge, and Mori claims, can handle 100 syllables a minute with 99.8% accuracy.

Mori also provided details about a Kanji optical character recognition system launched last year and a line drawing which can translate sketches into tidy plans.



BRANSCOMBE... Take human factors into account.

Wet finger approach lives on in design

THE "wet finger approach" lives on in the design of computer systems, said Lewis Branscombe, head of research at IBM. Branscombe put forward at the IFIP conference some "best guidelines" for developing systems architecture which takes the human factor into account.

Branscombe said that while "we know that there are significant and widespread implications of system architecture on user friendliness, next to nothing is known about how to make fundamental architectural decisions as a result of an emphasis on human factors."

Branscombe said it was important that all programmers, architects, and documentation writers have some appreciation of human factors.

Standards for human interfaces would seem a high priority, he said, but not enough is known about software human factors to make standards more operational.

Branscombe's first design guideline for system developers is to separate the system user interface from the rest of the system. That way changes to the user interface can be made without a complete rewrite of the program.

Another suggestion Branscombe made was a "layered" interface, by which the command or menu interface could be altered according to the use of the machine and the user's level of expertise.

On the same line Branscombe suggested "personal interface preferences", which may eventually lead to users carrying a magnetic card to plug into a system to describe their personal data.

Branscombe said that in system design we must be aware of the world as it is even as we try to make systems more operational. He described an editor/formatter system under development at IBM's Cambridge research centre, called Polite, which can "undo" what users have done and back-up to the last action, a number of actions, or even to the beginning of a session. This kind of facility, Branscombe said, is often forgotten by systems designers.

He also said individuals often communicate better using "more channels" - for instance a mixture of audio and visual. That, he said, is a fundamental principle of information processing which has not been capitalised upon.

The small men still believe in mainframe

IFIP's world computer congress, traditionally a gathering of "big machine" people, is being subjected to the cancerous inroads of the microcomputer.

But Gordon Moore, chairman of Intel, the company which started the microcomputer revolution, told the congress that those in the small system world did not believe the big machine would disappear as more functions are put on the chip. Moore saw a co-existence between mainframe and microcomputers as large and more complicated networks are centred around the mainframe.

At the same time, he said, functions on large machines will come down to small machines.

The possibility has been reached already, Moore said, of putting the whole IBM 370 instruction set on a single chip. That was a possible, and logical direction for someone to take, which would make an enormous software base available at the personal computing level.

While Moore said it was extremely difficult to predict more than a few years into the future, he



MOORE... "Functions on large machines will come down to small machines."

believes the ability to build more complex structures will continue as in the past. Silicon, he thinks, will continue to be the most widely used material, because of its wide availability compared with substances

such as gallium arsenide, which will be used only for specialised applications.

Moore also indicated that many applications will stop at 16-bit processors, since such processors

are more than adequate for the job. But 32-bit microprocessors will not be generally available for some time. Intel's own 32-bit 486 was very slow, he said, going in for functionality, not speed.

Commercialism stays the driving force

COMMERCIALISM, not interaction, has been the driving force in most US citizen participation computer projects in the US.

Bill Dutton, an associate professor at UCLA, drew on case studies he has done in Los Angeles to explain how community interactive cable television is more interested in market share and production quality, without controversy, than in audience participation.

His case studies also showed that the services are primarily used by wealthy communities, putting paid to the notion that such services might widen the decision making process to less privileged sectors of society.

Many technological systems, particularly cable systems, are looking for a problem, according to Tomas Ohlin, a Swedish authority on the videotext industry.

Many people are buying personal computers without knowing what to do with them - an example of technology waiting for an application. But when cheap

modems are available - as is happening in parts of Europe - millions of terminals will be available.

Starr Roxanne Hiltz, of the New Jersey Institute of Technology, warned of the potential elitism of such systems. Corporations and the wealthy would pay for access, but who would pay for the average citizen? she asked.

But to show the potential, Hiltz described the Electronic Information Exchange System (EIES), a computerised conferencing system designed by Murray Turfitt, which is being used by President Ronald Reagan as a backdrop to an October "White House Conference on Productivity". Around 200 participants used online micros in their homes to prepare a presidential report on how to improve productivity in the US.

The participants judged they had produced high quality recommendations far better than would have been possible in face to face meetings.

Scientists want to be free from technology

THEORETICAL computer scientists want to be freed from technology, which is forcing them to run before they can walk. That was the message from a discussion on "tough nuts" in theoretical computer science held at the IFIP conference.

"Computer science is dominated by technological developments," said Juris Hartmanis of Cornell University. "Applications are exploding and computer science is being pulled apart and not being allowed to develop peacefully."

Dines Bjørner, of the Danish Data Processing Centre, agreed with the sentiment: "The process of development is more important than the product," he said.

The academic computer scientists want to find a common First Law to establish the theoretical foundations for computer requirement analysis and definition so as to free computer science from technology - they are searching for a computing equivalent of the

First Law of Thermodynamics.

Several top theoretical computer scientists were asked to set out what they saw as the fundamental problems of computer science. "A key tough nut in artificial intelligence is how to create a common-sense database," said John McCarthy, of Stanford University.

"For example, how do you change an airline reservation system directly so that Iraqis don't sit next to Iranians?" he asked. "The aim is to change the programs without reading them and that needs a common-sense database."

"There's too much emphasis on syntax of natural language," he continued. "For more powerful programming languages we need to concentrate more on the semantics of natural language."

"A real problem is to find a theorem to show that the time taken to compute equals the size of the task divided by the speed of the computer," McCarthy concluded.

SOFTWARE AND TECHNOLOGY

"We never looked back" is typical of the comments made by users of Apple's Lisa, the mouse-driven computer. Users are adapting quickly and naturally to mice, especially where the software makes full use of the mouse capabilities. Just think how many times you have to push different control buttons in, for example, a word processing package. How much easier it would be if the functions were indexed on the screen and all that was needed was to move the mouse on your desktop and push a button. In fact, extensive research into the use of mice has shown that users become very proficient and able to move the mouse swiftly and accurately, running through a sequence of commands much quicker than otherwise possible. In most cases, the mouse was preferred to the comparatively strenuous activity of leaning forward to touch screens, or the imprecise track-ball. Why not try a mouse?

Providing a consistent upgrade path has been one of the prime design objectives behind the MS-DOS operating system. This upgrade path allows both software developers and users to take their programs from one computer to another. MS-DOS initially provided the upgrade from the 8-bit world of CP/M-80. Today, MS-DOS runs on the vast majority of 16-bit systems and is firmly placing itself as the operating system for the future. On the other hand, in the world of multi-user microcomputers, the XENIX operating system is well established. The latest versions of XENIX, and the latest version of MS-DOS share a certain amount of compatibility which allows properly written programs to run on both systems. Operating systems such as XENIX have long been used in communication and mailing systems, offering the ability to work on many programs simultaneously. Now these features are being brought to future versions of MS-DOS by Microsoft, the company who also supplies XENIX. The upgrade path will then extend across single and multi-user micros, and across all the major microprocessor families.

With today's rapidly changing hardware market, micros almost become out of date if they are more than six months old. For software developers, this poses something of a problem. The packages developed on one machine will have a lifetime limited by the success of that particular hardware. What the software developer needs to look for is the right development environment. Based on the MS-DOS operating system, development environments of the IBM PC and ACT's Sirius, for example, are both similar. It is though, presumptuous to assume that these will be the mainstream machines in 12 months' time. What the developer needs is a consistent development environment (one which allows him to run his software on many different machines immediately) and one which will be there on future generations of micros. Having already eased the transition from 8-bits to 16-bits, MS-DOS is now offering compatibility with the popular XENIX multi-user operating system. MS-DOS will shortly give access to the new, exciting world of graphics, multi-tasking and networking. For the software developer, a forward-thinking development environment of this kind spells success in an otherwise unstable market.

About that 'development environment' - from portables and IBM 'lookalikes' to any of the other major 16-bit micros on the market, one thing is clear, namely, that there is a firm commitment by computer manufacturers to offer this consistent development environment. Have you noticed how almost every newly announced 16-bit micro comes with the same operating system, MS-DOS? From the major manufacturers such as DEC, Wang, IBM, Data General and NCR to the 'portables' manufacturers, such as Hyperion, Compaq, Gavilan and ACT's new Apricot, MS-DOS is always offered, generally as that manufacturer's preferred operating system. Look also at those machines now on the market which do not even have the boards to run MS-DOS, and Apple is rumoured to be thinking along the same lines for its revolutionary Lisa computer. So, wherever you go, it looks as though you'll always be able to take your favourite software packages with you.

MICROSOFT

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COMPUTASTARS EUROPEAN FINALS



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Taking part in Euro finals

FINISH! Below are those who took part in the European final. First named person is team champion. Asterisk denotes team captain. Vets denotes veteran teams. M.D. denotes small firms.

MEN
Kalamazoo: 11. Malcolm Shunkworth, (12) Ian Whitby, (13) Barry Harrison, (14) Ray Harrison, (15) Bob Harrison, (16) John Harrison, (17) Digital 2 England, (18) Simon Penfold, (19) Paul McArthur, (20) Bob Thurston, (21) Cal Harrison, (22) Stanley Vainder, (23) USO Appleton, (24) John Harrison, (25) Rob Lattimer, (26) John Potts, (27) Ben Voser, (28) Greg Wilson.
NPI: 71. David Goss, (72) Michael Parks, (73) Andrew Kalamazoo, (74) David May, (75) Robert Park.
Kalamazoo 2: 91. Phil Wright, (92) Richard Johnson, (93) Jeff Harrison, (94) Richard Smith, (95) Ron Osborne.
Hewlett-Packard: 111. Emma Grant, (112) Martin Smith, (113) Fred Van Houten, (114) Van Houten, (115) Thodor Vagchang.
Scottish Widens Fund and Life: 21. Bernie Cullen, (22) Joe Buchanan, (23) John Ross, (24) Dave Halliday, (25) John M. Vee, (26) Central Beher, (27) Mike Kaiter, (28) Mrs. Vail, (29) Ben Kaper, (30) Tom Vee.
Burroughs 1: 61. Lando Barrels, (62) Arthur Van Leuven, (63) Rex Lee Hre, (64) Rob Dugman, (65) Paul Kner.
Sheffield Insulating: 81. Mike Althe, (82) Keith Whitmer, (83) John Whiting, (84) Mark Warren, (85) Bob Mason.
Legal and General Ass. Sec. Value: 101. Colin Pinner, (102) Dave N. Sine, (103) Bob Carr, (104) Mrs. Mair.
Digital 2 NL: 121. Rob Kaiter, (122) Ben Goss, (123) Gus Harrison, (124) Tim Van Gersden, (125) Max News.
Landon Borough of Lambeth: 131. Geoff Clarke, (132) Mary Albertson, (133) Peter Wright, (134) Andy Ryan, (135) John Eason.
Harwood and Partners: 141. Bill Edwards, (142) The Broomer, (143) Phil Miller, (144) Phil Miller, (145) John Kaiter.
All Round Systems SU: 151. Alan Van Den Berg, (152) Harry Nieuwenhuis, (153) Joop Van Veen, (154) Peter Zurek.
Barclays Bank Radbroke Hall: 161. Dave Carr, (162) John Bremner, (163) Jan Cichocki, (164) Scotland, (165) John Kaiter.
Scottish Widens Fund and Life Vets: 211. Neil McQuay, (212) Sandy Brewster, (213) Jimmy McQuay, (214) Gordon Smith, (215) John Kaiter, (216) Apple 1, (217) Tom De Wit, (218) Henk Mitter, (219) Alan Johnston, (220) Tony Patti.
Arc Automation Services: 221. Paul De K. Pinner, (222) Rod Hore, (223) Joe Hoogstraet, (224) Balazs Gerelch Melying, (225) Cees Roukman.
Digital 2 (V): 231. Sjaak Imhof, (232) John Brouwer, (233) Jan Awater, (234) Willem Seldin, (235) Ton Van Workum.
Commercial Union: 241. Les Davis, (242) Andy Gutteridge, (243) Gordon Davies, (244) John Underwood, (245) Steve Richardson.
Back of America: 251. Vernon Turner, (252) Don Morgan, (253) Mike Norton, (254) Eric Mackman, (255) John Wynn.
Leggers: 261. Larry McDonald, (262) Mike Wynn, (263) Paul Gouda, (264) Andy Bowen, (265) Martin Pate.
Hewlett-Packard 2: 271. Russel Batten, (272) Stuart Archer, (273) Tony Weiss, (274) Gary Murray, (275) Phil Walker.
Svenska Bz Zellinger: 281. East Walraven, (282) Guy Douglas, (283) Dick Turk, (284) Vick Kiehn, (285) Brian Gillie.
Central Beher Vets: 291. Fred Jensen, (292) Arnold Van Impeken, (293) Wim Hendrick, (294) Benno Tegeler, (295) Jan Kerkkamp.



European champion Phil Wright models the latest in sporting headgear.



European champions Kalamazoo, flanked by second placed Burroughs (left) and third Barclays Radbroke Hall.

Another victory for Kalamazoo — and for Phil

WELL, they did it. Kalamazoo took the grand slam at this year's Computastars European final. The men's and women's team and individual trophies were all gleefully taken away to be placed in the Birmingham firm's display case after a convincing overall victory.

But in a turnaround of last year's results, three of the top five teams were Dutch, with Burroughs taking second place.

The first event of the day, the javelin, was a three-way split, with Burroughs of Holland sharing victory with their countrymen from Hewlett-Packard and Digital 2 from the UK. (To make things confusing, there were two Digital 2s, one from Holland and one from the UK.) Burroughs' number one, Guido Bartels, went into an early lead in the individual stakes, thanks to a good performance in this event, as did Janet Carter of Cass and her team.

Next came the football, now extended to encompass the full gamut of soccer skills — throwing, heading, dribbling and shooting. Flying the flag for Britain in this event were Barclays Radbroke and their number one, Dave Cain.

The women had to contend with hockey instead of football, where the heading aspect of the competition is dropped. Barclays Radbroke and their number one, Liz Porter took the team and individual honours, beating Digital 2 (the Dutch one) into second place.

After two years of telling me that cycling wasn't a viable event, Computastars supremo Gordon Cairns introduced it. And rather splendid it was too. A flatom course, two cessways, a bridge and a event which defeated all but a few plucky competitors.

The Dutch enthusiasm for bicycles stood Central Beher in good stead, as they beat their fellow countrymen from Hewlett-Packard into second place. It was left to Legal and General veterans to salvage British pride with a fine

effort, which saw them sharing third place with Central Beher veterans.

Dutch teams triumphed in the women's competition too. Digital and CMC took first and second places respectively. Best placed UK team was Kalamazoo, finishing third.

Another new event took place just before lunch. For overs and unders there was a bar suspended about 2ft above the ground, which the competitors had to jump over and crawl under without knocking it down. Sounds easy? You're wrong.

It was again a Dutch team that proved to be best. Digital 2 beat Kalamazoo 1 by a solitary point, and Kalamazoo number one Phil Wright scored his first individual victory, sharing the title with Russel Batten of British Aerospace.

Another win for Barclays Radbroke came as its women's team shared the honours with Case, but it was Allison Grant of Kalamazoo who scored the first of three individual wins, with no fewer than five competitors tying for second place.

At the halfway stage in the competition it was Central Beher leading Kalamazoo 1 by a single point, with Barclays Radbroke two points behind, lying third. The individual ratings looked very similar as Tom de Wit and Phil Wright were separated by a solitary point. Enno Graal of Hewlett-Packard was also one point away, in third place.

The women from Kalamazoo and Allison Grant led the women's competition at the break, with Digital and Barclays Radbroke in second and third places respectively. Janet Carter and Liz Porter were hard on the heels of Allison Grant, with only four points separating the top three competitors.

After lunch Kalamazoo 1 began the attempt to retain the title in earnest. With the 200 metres they moved into the lead for the first

time, a position they were not averse to for the remainder of the competition. Although Simon Pentland beat Phil Wright into second place, Wright's performance was good enough to extend his lead over Graal to 11 points.

Barclays Radbroke and tied for first place in the women's 200 metres, with Kalamazoo second, and Liz Porter added another win as she beat Janet Carter and Sue Richardson into joint second.

Next came basketball. With a course over 80 metres in length, it proved to be rather more demanding than first impressions would lead you believe. Undaunted were Kalamazoo 1 and Phil Wright, who beat Burroughs and Guido Bartels into second place.

The women displayed more skill in the basketball. Their shooting was consistently more accurate than the men's. Kalamazoo and its number one triumphed to extend their leads.

A modified event followed, but yet another attempt to make things more difficult. Gordon Cairns introduced a jump between the hurdles — how was it supposed to be done? The women were set at about 9in all the competitors chose over.

Burroughs beat Kalamazoo and Crawford into joint second place, with first place in the individual being shared between four competitors: Guido Bartels, Tim Boudreth, Sjaak Imhof and Robert Hurst. The women from Kalamazoo walked, or sprinted, away with this one, beating second placed Crawford by six clear points.

Number one Allison Grant closed up her third win of the day as Janet Carter finished second.

The last event of the day was billed as The Race. Details of the concept were vague, but it was rumoured that it would involve going through the water jump the wrong way, among other things.

Continued on page 31



The very wonderful Worthing Rams from the Inland Revenue — OK for my new tax code!



Sponsored by Computer Weekly

Continued from page 30

This was not to be, however. Because time was short, that old favourite, the steeplechase, was brought back. The announcement was greeted with a mixture of cheers and groans.

Those with least reason to groan turned out to be Kalamazoo, for although they finished second behind NPI they scored sufficient points (or Burroughs failed to score sufficient points) to take overall victory and the European title yet again.

Piet Walraven, Les Davis and Dave Cross finished equal first in the individual, but again Kalamazoo's Phil Wright had done enough to secure victory, but by only 11 points from second placed Enno Graal.

It was no walkover for the Kalamazoo women either. Barclays Radbroke finished eight points adrift at the end of the day thanks to a second place in the steeplechase. The winners, Case, ended in third place overall. Allison Grant took the individual title, but Liz Porter was only seven points behind, after winning the steeplechase. Last year's European champion, Legal and General's Anne Bragg, was ruled out of the competition due to injury, so we can only surmise what might have happened if she had appeared. Maybe next year?

The lovely ladies from the Inland Revenue Worthing Rams Computing team avenged last year's shock defeat by Dutch team Consulting Associates, and polished off their BEM I in a splendid final.

Finally, thanks are due to the four sponsoring firms which stepped into the breach at the last moment to save the final Kalamazoo, Legal and General, Heywood and Partners, and Crawford Computing.

And that's Computastars for 1983 — a year in which we saw the standard rise noticeably, apart from the Computer Weekly teams, that is. It rained a bit. Well, quite a lot actually, but I for one thoroughly enjoyed myself.

Report and pictures by Andrew Thomas



Kalamazoo's Ann Hardy in the over and under.



Gordon Davies on the home straight in the 200 metres.



Crawford's celebrate 17th place by throwing a supporter into the water jump.

The winners

MEN'S TEAM RESULTS

Rank	Name	Points	Total
1	Kalamazoo 1	30 30 28 34 35 45 34 37	273
2	Burroughs 1	34 30 25 22 26 39 39 27	242
3	Barclays Radbroke	25 25 26 24 29 34 26 27	227
4	Hewlett-Packard	34 24 36 24 21 30 28 25	225
5	BSO Appleton	29 36 22 18 26 36 15 28	220
6	Scottish Widens	16 27 13 23 32 39 32 36	218
7	Digital 2 UK	34 32 17 26 21 30 27 24	214
8	Commercial Union	13 30 27 29 30 33 23 21	216
9	Digital 2 NL	22 15 32 35 22 33 32 24	215
10	Apple 1	28 30 32 19 30 32 27 24	214
11	Heywood & Partners 1	20 18 24 26 31 30 28 25	213
12	Rouvenet Macintosh 1	16 42 22 28 26 18 30 30	212
13	N.P.I.	21 15 24 21 35 21 25 39	201
14	Digital 1 NL	30 21 18 14 38 24 21 26	182
15	All Round systems SU	19 27 22 27 23 21 27 31	197
16	Central Beher 3	19 39 37 28 16 21 19 17	196
17	Crawford Computing 1	19 24 17 22 26 16 34 31	191
18	Sven En Zellinger	30 21 18 14 38 24 21 26	182
19	British Aerospace 2	23 18 25 26 22 21 22 24	181
20	L. B. Lambeth	21 12 23 19 28 15 29 33	180
21	Legal & General Vets	14 24 18 25 19 21 20 20	162
22	Legier	19 10 28 16 34 18 21 17	171
23	Caterpillar	10 27 25 20 16 30 16 18	162
24	Scottish Widens Vets	14 24 18 25 19 21 20 20	162
25	Sheffield Insul. SU	12 18 21 20 16 21 20 20	158
26	Kalamazoo 2	10 6 13 20 10 15 24 25	143
27	Central Beher Vets	12 21 32 21 16 6 22 12	148
28	Arc Automation Svs	13 9 27 17 16 6 17 22	137

MEN'S INDIVIDUAL RESULTS

Rank	Name	Points	Total
1	Phil Wright	12 10 12 13 12 15 10 13	97
2	Enno Graal	12 10 11 11 8 10 12 10	86
3	Guido Bartels	13 10 9 7 11 8 12 10	84
4	Les Davis	5 10 14 11 11 11 8 14	84
5	Tom de Wit	13 10 14 11 7 10 8 10	83
6	Simon Pentland	12 10 7 12 7 10 13 8	82
7	Dave Cain	11 15 7 9 10 8 12 8	80
8	Piet Walraven	13 7 9 11 10 8 8 14	80
9	Marco Van Den Berg	12 9 9 11 9 7 10 12	79
10	Tim Boudreth	7 14 12 11 10 7 10 10	78
11	Russel Batten	7 9 6 12 8 7 8 11	74
12	Bill Edwards	7 6 9 11 10 10 8 12	73
13	Sjaak Imhof	6 5 8 11 10 11 12 7	72
14	Gerrie Callaghan	4 8 12 11 7 10 12 7	71
15	Hurth Groneman	4 12 7 9 12 8 8 8	69
16	Rob Kaiter	11 10 7 11 9 10 8 8	69
17	Robert Hurst	9 8 12 11 7 6 12 13	69
18	Rob Timmerman	9 13 11 7 7 7 10 7	68
19	Dave Cross	10 5 7 7 10 7 7 14	67
20	Veteran	6 8 7 11 7 7 10 7	65
21	Veteran	6 8 7 11 7 7 10 7	62
22	Harry McDonald	8 10 11 11 6 8 8 8	62
23	Patrick Vilverman	2 9 9 9 9 10 6 7	58
24	Geoff Clarke	7 4 7 4 10 10 5 10	57
25	Veteran	6 5 9 11 5 10 10 6	56
26	Malcolm Shuttleworth	6 5 2 5 6 11 5 10	51
27	Mike Althe	1 7 7 5 8 7 8 7	50
28	Paul De Kiehn	4 3 9 9 6 2 7 7	47

WOMEN'S TEAM RESULTS

Rank	Name	Points	Total
1	Kalamazoo	24 39 31 29 25 45 39 30	262
2	Barclays Radbroke	22 45 16 34 33 42 38 32	254
3	Case	22 21 34 26 35 38 24 27	213
4	CMC	22 21 34 26 35 38 24 27	207
5	Crawford Computing	26 33 17 24 20 24 23 21	198
6	Digital NL	17 42 38 24 22 6 25 24	198
7	Central Beher 3	24 11 28 24 20 18 21 18	185
8	Hewlett-Packard	16 24 27 14 20 18 21 25	165
9	Commercial Union	23 18 20 22 15 27 19 20	164
10	Digital UK	15 6 22 22 22 24 21 17	164
11	Burroughs	19 18 27 14 17 6 14 14	129

WOMEN'S INDIVIDUAL RESULTS

Rank	Name	Points	Total
1	Allison Grant	6 13 9 15 9 15 15 11	91
2	Liz Porter	7 15 5 12 12 14 9 12	86
3	Janet Carter	12 8 10 12 10 6 12 10	80
4	Suzanne De Vries	2 7 10 12 12 7 11 17	67
5	Lisabeth Marfus	2 14 9 12 7 2 9 9	64
6	Bon Richardson	5 2 5 12 10 13 7 8	62
7	Caroline Williamson	6 11 9 8 7 8 9 6	59
8	Margaret York	4 11 9 8 11 5 12 9	59
9	Susan Mason	6 7 8 8 9 5 7 7	57
10	Jon Van Der Pect	10 6 9 6 6 6 2 9 9	57
11	Piona Stammer	10 6 5 8 7 9 5 6	56

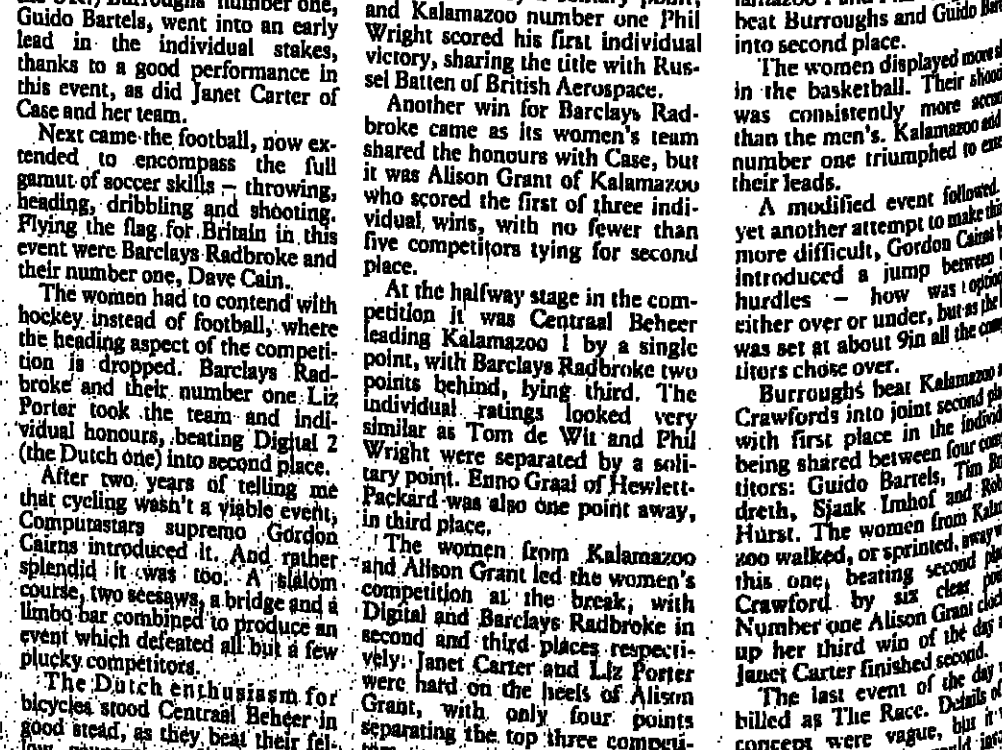
Events are from left to right: javelin, football, cycling, over and under, 200 metres, basketball, sprints, steeplechase, heading by Computastars Computer.



Hewlett-Packard's Enno Graal in the modified sprints.



Barry Preusse knocks down an obstacle in the cycling event.

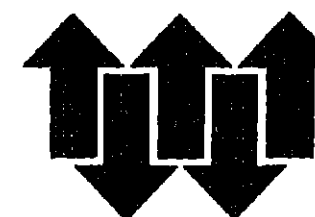


Allison Grant of Kalamazoo springs to victory.



Third-placed Case play to the crowd as winners Kalamazoo take the European trophy. Winners up Barclays Radbroke look on.

COMPUTER TRADE FORUM

AUTUMN
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Birmingham 1-7 October

Computer sales in UK rise faster than expected

John Aczel reports a dramatic growth in the market for systems and peripherals, despite a slackening off in other industries

SALES of computer systems and peripheral equipment in the UK have risen by 15% and overall demand has grown faster than expected. The latest statistics indicate buoyancy in the computer sector and this is likely to be well maintained during the next 12 months.

Over the past year, demand for hardware has expanded markedly and in 1982 it is estimated that sales have totalled £1,500 million at manufacturers' prices. This does not include wholesale and retail margins, and the value of the market was much higher when all distribution costs are taken into account.

Growth of the market in 1982 has been quite pronounced, despite the slack conditions in British industry as a whole. The overall growth in demand has averaged 15 per cent, but this has varied considerably according to the product groups concerned. Allowing for inflation, the real growth has been at least 10% after taking into consideration increases in retail prices. This is probably an underestimate as costs of many computer products have been falling sharply and the volume of demand has grown much faster for a number of products, particularly for disc storage units and printers.

There is little doubt, however, that the computer sector has been one of the most dynamic areas in the British economy. During 1982, gross domestic product increased by only 1% and, in most parts of the British economy, demand has been slack. Thus, the computer sector has had a truly outstanding performance, and this expansion is likely to be surpassed by a wide margin during 1983.

Though a number of estimates have been made about the size of the market for both computer systems and peripherals, the official statistics contain many gaps and their information is not fully comprehensive. Only the bigger companies take part in the survey carried out by the government and, according to the official estimates, about 90% of establishments are included in the investigation. Some of the figures are subject to considerable revision, and any statistics given at this stage have to be treated with considerable care because of this.

Overall statistics about the size of the market are not available and various ways have been used to assess this trend in the computer sector. One of the best methods is to take the production figures and adjust them by exports and imports to get some idea of sales. But this is a crude method and does not allow for a number of factors, particularly changes in stocks.

In addition, the price levels may be somewhat confusing, though in most cases they are at manufacturers' prices. To make allowances for distribution margins, particularly for wholesale and retail costs, is impossible, as they vary considerably according to the product.

Total sales of computer systems have been expanding in 1982 and it is believed they amount to around £560 million which was a growth of 10% compared to 1981. The official statistics do not break them down in terms of mainframes, minis and micros, but it is reckoned that, for sales for micros the rate of expansion has been much higher, possibly averaging over 40% in volume terms.

Production of computer systems and central processing units has also gone up and reached over £390 million. The official figures reveal a growth of only 7% for output, but this may be due to the fact that they are not fully comprehensive.

The latest figures for production refer to the first quarter of 1983 and they show that output has gathered momentum in the quarter. Output amounted to nearly £124 million, which was up by over 20% compared with the same period in 1982. It is believed that the trend has been gathering speed and that this growth will be well maintained in 1983.

Exports of computer systems have made good progress throughout 1982 and reached over £300 million. This was a rise of 30% compared to 1981, while for the first quarter of 1983 sales advanced by 26% to reach a record of £87 million.

Exports to the EEC countries have moved ahead markedly. Sales to France reached £13 million for processing units, while to Germany they amounted to £18 mil-

Netherlands.

As a result of the sharp increase in imports, Britain's trade balance for computer systems and CPUs went further into the red. The situation was already critical in 1982, when a gap of over £170 million was seen. For the first quarter of 1983, this imbalance was growing and reached £70 million during the period.

Foreign suppliers of computer systems are now presenting a strong challenge to British-based firms, and at the beginning of 1983 they accounted for 80% of total sales within the UK market. This proportion has been rising and could continue to go up despite the strength of the dollar, which is forecast to continue in the coming months.

Demand for peripheral equipment has grown even faster than for computer systems, and in 1982 the size of the market for add-on equipment amounted to around £350 million. This was up by 18% compared to the previous year, with a particularly fast growth being shown for printers and storage units.

According to the latest figures,

Foreign suppliers of computer systems are now presenting a strong challenge to British-based firms and at the beginning of 1983 they accounted for 80% of the total sales within the UK market. This proportion has been rising and could continue to go up despite the strength of the dollar.

lion. A strong growth in other European countries has also been seen, with significant expansion reported in Italy, the Netherlands and Belgium.

Trade has been progressing well in other parts of the world and useful gains have been recorded in the US, Australia and some of the Eastern European countries. The fairly low level of sterling has made exporting easier, though competition has been quite fierce in many overseas markets. Thus prices of CPUs have been dropping and have averaged a fall of about 20% compared to 12 months ago. Even so, British manufacturers have been willing to accept these price cuts, especially as the exchange rate has been to their advantage in recent months, particularly against the dollar.

Imports of computer systems have also risen sharply, and in 1982, they amounted to £476 million. This was a gain of about 25% compared to the previous year, while the trend has gathered considerable speed in the early part of 1983.

Total imports in the first three months of 1983 moved up to £157 million, a growth of 50% compared to the same quarter in 1982. The underlying trend for computer systems has been very strong, particularly from the US.

Deliveries by the US accounted for over 30% of the total in terms of processing units and complete systems, and for the first three months of the year they were valued at nearly £50 million for CPUs on their own. Imports of CPUs from West Germany have also been at a high level, totalling £13 million in the first three months of 1983, while significant sales have come from suppliers from Denmark, France and the

however, expansion has been even more rapid during the first three months of 1983. Total sales amounted to £285 million at manufacturers' prices and were up by 30% compared with the same quarter in 1982. Growth has been higher than expected, and by volume, this rise has been even sharper, in view of the fall in price in many peripheral items.

Production of peripherals has also gone up, but not as fast as overall demand. Thus output reached £183 million in the first quarter of 1983 which was a gain of 14% compared with the first quarter of 1982. Last year, output for peripherals moved up relatively slowly at 6% and amounted to £178 million. Clearly, production has not kept in line with overall sales, and the differential has been made up by the substantial increase in imports for peripherals.

In 1982, total imports of peripherals rose by over 30% to nearly £720 million. British imports of disc storage units in the first three months of 1983 amounted to £53 million and the value of imported printers jumped to £39 million. Foreign deliveries of VDUs have also been higher and amounted to nearly £30 million in the first three months of 1983, and a strong growth in terminals and other types of equipment has also been seen.

Competition in the peripheral market has been intense and the US has maintained a strong lead. Its sales reached £115 million in the first three months of 1983, but a major challenge has been seen from some of the Far Eastern producers, particularly Japan. Japanese sales of peripherals continued to make strong progress and amounted to £16 million. For some product groups, in-

port prices have come down significantly and, in the case of printers, dropped by about 50% in imported prices. Evidently some foreign manufacturers have been willing to cut their prices sharply in order to keep their volume at a satisfactory level during this period.

Exports of peripherals have also performed well and amounted to £440 million in 1982. This was an increase of 20% compared with the previous year, while for the first three months of the current year, sales from overseas markets have gone up by around 15% to £116 million.

British exports have been concentrated in certain areas and have performed particularly well with VDUs. Their value went up to £40 million in the first three months of 1983, while a similar increase has also been seen for disc storage units, with their value amounting to £19 million in the first three months of the current year. It is estimated that over 130,000 peripheral units were sold abroad and the average price has been coming down sharply.

Several bullish factors are likely to influence demand for computer systems and peripherals. For one thing, the general economy in the UK is showing signs of picking up, even though the process may be relatively slow. For instance, the growth in gross domestic product could average 2.5% this year, following a minimal rate of increase in 1982. Interest rates are now fairly stable and lower than they have been in previous years. This is important as it should enable companies to install new computer systems at lower interest charges.

In addition, the profitability in industry is improving and the cashflow of many firms is showing signs of perking up. Thus there will be more resources available for commitment to new computer systems as well as to extending existing capital expenditure, which has been at a fairly low level over the past few years, is improving, and, according to the latest forecasts, total investments will increase by at least 5% in real terms. Naturally, computer installations only represent a small proportion of overall capital expenditure, but above average outlay on computers is expected in the financial sector, the service industries and the oil sector.

In addition, prices of computer systems and peripherals are coming down sharply and this is opening up the market considerably.

During 1982, the market for computer systems and peripherals was estimated at £1,500 million at manufacturers' prices. A growth of around 30% is quite possible for this year and overall demand could reach about £2,000 million in 1983. Naturally, these are only tentative estimates, but they highlight the strong growth likely to occur in the computer sector during 1983 and which will be well maintained in the coming year.

On present trends, an above average growth rate will be seen in the peripheral sector and sales of certain items will increase rapidly. In particular, demand for efficient and cheaper printers as well as for high capacity storage units is likely to be at a high level. Competition in these fields, however, will remain fierce.

TABLE 1: PRODUCTION OF COMPUTER SYSTEMS IN UK (including central processing units)

	£m
First quarter 1981	95.5
Second quarter 1981	87.0
Third quarter 1981	80.1
Fourth quarter 1981	94.2
First quarter 1982	102.0
Second quarter 1982	86.1
Third quarter 1982	104.0
Fourth quarter 1982	95.0
First quarter 1983	123.3

TABLE 2: EXPORTS AND IMPORTS OF ELECTRONIC COMPUTER SYSTEMS (by value)

	Exports £m	Imports £m
Fourth quarter 1981	80.3	112.7
First quarter 1982	68.8	105.3
Second quarter 1982	71.5	114.1
Third quarter 1982	69.2	114.6
Fourth quarter 1982	92.1	142.5
First quarter 1983	87.3	156.9

TABLE 3: SALES OF ELECTRONIC COMPUTER SYSTEMS IN UK (including central processing units) - BY VALUE (£m)

	1983 First quarter	1982 Fourth quarter	1982 First quarter
Production	123.8	95.0	102.0
Exports	87.3	92.1	68.8
Imports	156.9	142.5	105.3
Sales	193.4	145.4	138.5

TABLE 4: PRODUCTION OF PERIPHERAL EQUIPMENT IN UK

	1983 First quarter	1982 Fourth quarter	1982 First quarter
Storage units	20.1	17.8	18.5
Input/output units	100.5	110.2	93.2
Other units		60.7	45.6
Other offline data equipment	62.9*	5.3	3.8
Total	183.5	194.0	161.1

TABLE 5: TREND IN PRODUCTION OF STORAGE UNITS

	£m	Index 1981=100
First quarter 1981	20.0	100.0
Second quarter 1981	16.4	82.0
Third quarter 1981	15.8	79.0
Fourth quarter 1981	19.2	96.0
First quarter 1982	18.5	92.5
Second quarter 1982	16.1	80.5
Third quarter 1982	23.0	115.0
Fourth quarter 1982	17.8	89.0
First quarter 1983	20.1	100.5

TABLE 6: TREND IN PRODUCTION OF INPUT/OUTPUT UNITS

	£m	Index 1981=100
First quarter 1981	86.9	100.0
Second quarter 1981	87.3	100.5
Third quarter 1981	84.5	97.2
Fourth quarter 1981	110.8	127.5
First quarter 1982	93.2	107.2
Second quarter 1982	93.5	107.6
Third quarter 1982	103.9	119.6
Fourth quarter 1982	110.2	126.9
First quarter 1983	100.5	115.6

TABLE 7: IMPORTS OF PERIPHERAL EQUIPMENT IN UK

	First quarter 1983 £m	Fourth quarter 1982 £m	First quarter 1983 £m
Storage units			
Input/output units	213.5	193.9	157.0
Other units			
Punchers, verifiers & calculators	0.1	0.1	0.2
Other offline data equipment	3.1	2.6	3.4
Total	217.7	196.6	160.6

TABLE 8: EXPORTS OF PERIPHERAL EQUIPMENT IN UK

	First quarter 1983 £m	Fourth quarter 1982 £m	First quarter 1983 £m
Storage units			
Input/output units	114.4	121.9	100.9
Other units			
Punchers, verifiers & calculators	0.1	0.1	0.1
Other offline data equipment	1.6	3.1	102.2
Total	116.1	125.1	103.2

COMPUTER TRADE FORUM

Where the dealers go to do their dealing

Philip Hunter previews the fruits to be picked in Birmingham's NEC next week

A RICH selection of micros and associated terminals, printers and disc drives will be on show at next week's Computer Trade Forum. The big companies are implemented by Burroughs, Honeywell, Perkin-Elmer, Texas Instruments, Perkin-Elmer, which distributes small business systems from these three industry giants, as well as DEC systems.

The reason for Burroughs' presence is to demonstrate to the trade that it offers perhaps the largest range of compatible computers, ranging from a £3,500 micro to a £250,000 B1985 mainframe. Perkin-Elmer's motive is to demonstrate the new 3206 supermini linked to its OEM Partnership Plan, which gives attractive discounts to OEMs.

Of particular excitement to dealers is the presence of Texas Instruments with its new TI Professional Computer. TI has come to the Forum specifically to find UK dealers for the computer, and to appoint authorised distributors for a new range of printers and terminals.

TI recently signed a contract in the US with retail chain Computerland, typical says the company of the outlet wanted in the UK. But there will also be room for smaller dealers, and TI is keen to push its own support and public relations facilities to help them.

Sapphire Systems, the UK software producer and distributor, is at the Forum to find dealers for its Profitlink scheme. The idea of this is that dealers attend training courses at £45 a day, and then pay a £95 a month membership fee, in return for the usual preferred dealer status plus regular advertising in Profitlink dealers as a group in computer magazines.

Datascop Micro Systems of London is another to launch a dealer support package, for the powerful Fortune 68000-based micro. And maintenance and supply company Terminal System Services will advertise its support package, which includes a final check of hardware before dispatch, and education of end users.

Consor Electronics will be at the Forum to promote its range of services including test, repair, installation, training and on-site maintenance. The company boasts that it carries out servicing to the Ministry of Defence Standard 0521, and offers an emergency service to fix circuit boards in 48 hours.

The fashionable artificial intelligence is represented by a company called Expert Systems, which will push several versions of the language Prolog.

The company will show Prolog interpreters running under VMS, RT-11, RSX-11M, CP/M and MSDOS, and it will be on the lookout for distributors to sell these versions of the language.

Also in keeping with the times, there is a fair turn out of software producers and distributors.

Logica VTS is to demonstrate its Pilot VTS system, which uses the Polynet local area network to connect workstations based on the company's VTS 2200 and Vitesse hardware.

Logica VTS, another exhibitor at the Forum, Modata Computer, both use file servers for local area networking, which means that several users can simultaneously work on a common database. Modata will be exhibiting its Micromaster product, which sounds quite similar to Logica's. It will be interesting to compare them at the show.

Visitors will also be able to see

and minicomputers is pretty blurred these days, the only discernible difference, apart from physical sizes, being that minis can usually support more peripheral equipment. Adds Mentor can perhaps claim that its 16-bit machine at the Forum is a mini, since it allows, in theory at least, up to 64 users, and up to 600 Mbytes of hard disc.

There is little doubt that the machine to be unveiled by Norsk Data, Norway's biggest indigenous computer maker, is a true mini. The company's new ND-570 outperforms most rival minis, and according to some bench tests, is top in the price/performance league, above the DEC Vax and Gould's supermini.

A computer is not much use without some backing storage, and hard disc is the option that combines plenty of megabytes with fast access. Century Data Systems will be showing various of its disc drives, including removable drives based in Winchester technology. Christie Electronics will be giving

Traditional accounting software will be demonstrated by The Financial Director Software company with its product called, not surprisingly, Financial Director. Despite its grand name, the product is not radically different from others in the market.

Holland Automation International will be launching its new Hai*Line package of integrated business software running under Microsoft's MSDOS. It will be demonstrated on several micros, including DEC Rainbow, IBM PC, Wang Professional and the ICL PC2.

For companies which want to do their own programming, Software Ireland will have its Sibol on show, which is a commercial programming language for the Unix operating system written in C.

Visitors will be bombarded with propaganda for 16-bit computers as they look at the various micro

A decent printer can bump up the cost of a small business system by as much as 50%

offerings. But not all 16-bit machines are the same.

Essentially there are two kinds: single user personal computers, often based on the Intel 8086 processor, and multi-user workstations which are several times more expensive, and often based on the Motorola 68000.

These 68000-based computers are often called 32/16 bit machines.

General Automation UK will demonstrate a range of machines in this category. The machines are priced between £8,400 and £31,000 and begin with a desk top micro and end with a machine which support 32 terminals, although in practice it is unlikely that more than about 16 users could work simultaneously.

Kode promises to announce a new range of these high powered super micros and will be looking for dealers to sell them. And Motorola itself will proclaim a new range of business systems to compete with the many machines that use its chips. The company's Information Systems Group will introduce the S2000 range, with, says the company invitingly, the tools to attack vertical markets.

The popular Fortune supermicro will be exhibited by one of the two appointed UK distributors for it, IBR Microcomputers, along with a range of financial software.

The line between supermicros

based on the Intel 8086 - such as the IBM PC - typically cost around £2,000. Ferranti is demonstrating such a machine at the show, the Argus Pro-Personal.

Tycom will be showing its Microframe based on the Intel 8088 with the option of adding on a 68000 and several Mbytes RAM to make a powerful multi user supermicro.

This can be seen at the Forum with Micro Peripherals offering a daisy wheel printer which delivers a high quality print for only £399, plus VAT. The same company also has a dot matrix printer, which produces a not-so-good print, for £28, plus VAT. Both these products are, needless to say, of Japa-

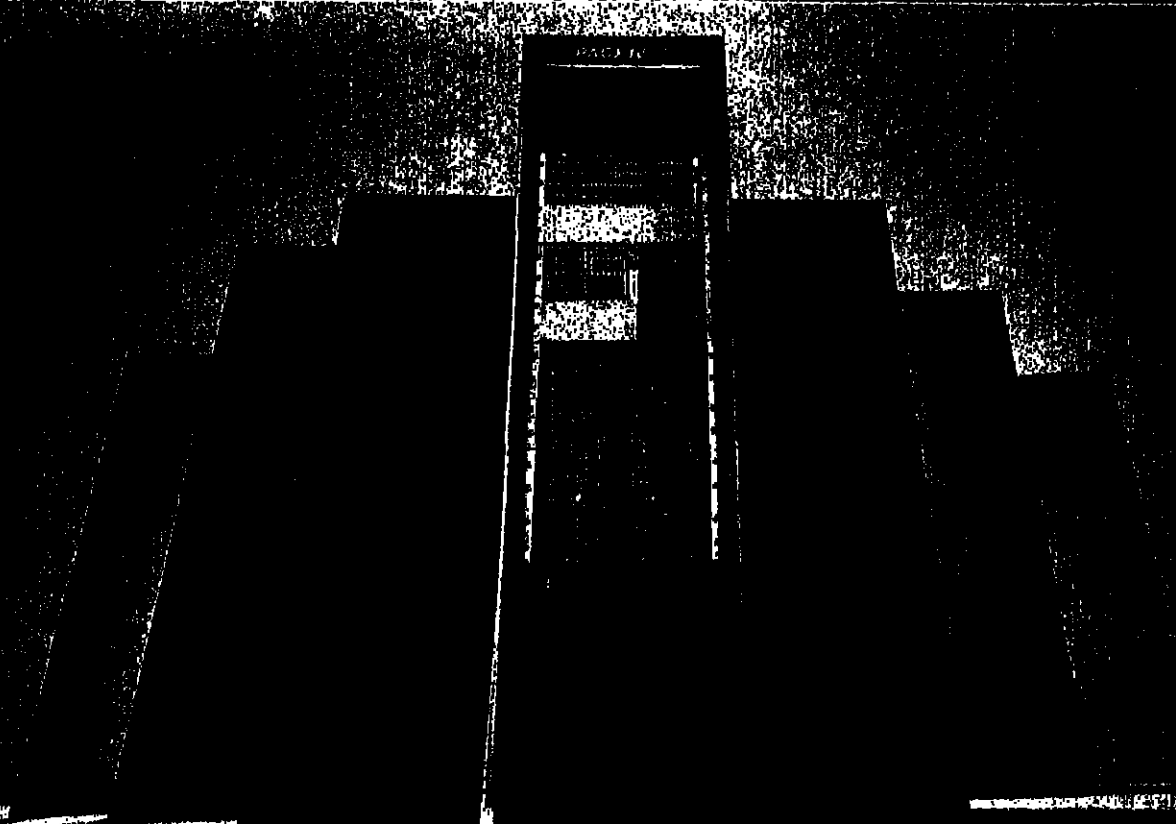
nese manufacture. Of the big companies that specialise in printers, Centronics is absent from the Forum, but Mannesmann Tally will be there to demonstrate the full force of its produce range.

Quime UK will be showing its Sprint range of daisy wheels, and Westwood Distribution will display the popular Lipson dot matrix printers on display.

Some printers are capable of plotting simple graphs, but for those who want a dedicated plotter, Holdene Trade will be exhibiting the Gould Bryan's colourwriter digital plotters.

9,830,400 bps

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Why not? The speed and efficiency of your data network expands. With Ganahl's new PACX IV SE Series you can send data twice as fast and expand your network to twice the size of other transparent data PACXs.

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FORUM 1983National Exhibition Centre
Birmingham 1-7 October

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PRODUCTS



Digital Engineering's DQ640 series Retro-Graphics enhancement.

Add Retro-Graphics to DEC's terminals

DEC VT100-Series video terminals, including the VT100 and VT102, can be upgraded to emulate Tektronix 4010/4014 graphics terminals with the addition of new DQ640-series Retro-Graphics terminal enhancements, manufactured by Digital Engineering.

Offered for \$970 to \$1,195 list price, DQ640-series models are printed-circuit card and CRT assemblies that install in DEC terminals, provide Tek 4010/4014 graphics features, and compatibility with programs written for Digital Engineering's VT640-series Retro-Graphics for DEC displays.

DQ640-series is available in 800-by-480 or 800-by-240 bit-map resolution.

With more than 25,000 installed, the widespread use of Retro-Graphics has prompted the

domestic DEC Field Service Organisation to offer both on-site and depot maintenance/service programs for Retro-Graphics updated DEC terminals.

Because it is 4010/4014-based, Retro-Graphics can be used to draw dot/dash/solid vectors, plot points, and transmit X-Y co-ordinates with a crosshair cursor. Additionally, 800-by-480 resolution models can be utilised for displaying all four Tektronix 4014 character sizes.

For terminal set-up, a unique user-friendly menu allows the operator to define and control graphics features, communications, and characteristics of I/O peripherals.

Digital Engineering (CW), 630 Bercut Drive, Sacramento, CA 95814.

Single mass memory for 12 terminals

A COMPACT 5 1/4-inch Winchester disc unit with 18 or 36 Mbytes capacity now available for Commodore machines can provide simultaneous mass memory for up to 12 terminals.

The hard disc unit is marketed by IMI Computing.

Commodore Basic 4, DOS 2.5 and IEEE488 compatibility mean that programs written for CBM 8000 series can be used almost without modification. In addition up to 40 relative files can be opened at the same time.

Multi-user file access protection is built into the unit's capabilities through disc status procedures.

A common printer can be established for use by any of the machines accessing the hard disc memory, and an IBM 3740 format floppy disc drive option can be used to exchange data in both directions with an IBM installation.

IMI Computing (CW), PO Box 216, Witton, Birmingham B6 7BA. Tel: (021) 356 4848.

Low-level monitoring system for £20,000

THE PMS Starter Package, a complete working production monitoring system, including hardware and applications software, from General Automation, is priced at under £20,000. GA plans to capture that part of manufacturing industry which has been deterred from introducing computerised monitoring systems on the basis of cost, and encourage the speedier introduction of pilot schemes in the larger concern.

Wally Wells, marketing manager of General Automation UK, said: "We have had considerable success with the comprehensive PMS system launched in 1982. A diverse range of industries, from bottling plants to engine block makers to writing instruments component manufacturers, has achieved increases in productivity of 10% upwards."

The PMS Starter Package is based on a GA Boss 20 16-bit

Low-cost drum plotter for mini or micro users

THE low cost DMP-42 drum plotter from Houston Instrument, launched in the UK by Sintrom Electronics, is suited for use with any micro or minicomputer to produce drawings for engineering, CAD/CAM, building and surveying and scientific research and development applications.

The price, £2,360, is claimed to be the lowest for an A1/A2 plotter on today's market.

The DMP-42 can be used to plot complex plots such as topographic maps, weather charts and piping layouts for chemical plants. It will plot on 16.5x23.4 inches and 23.4x33.1 inches media, as well as on architectural 24x36 inch media.

Using a software or built-in firmware pause command, it is possible to change the pen to plot in as many distinctive colours as are required for each application.

The DMP-42 is supplied with an adjustable floor stand which allows the plotter to be placed at desk height for ease of use. Bond, vellum, clear film or synthetic plotting media are precisely registered under the moving pen by a

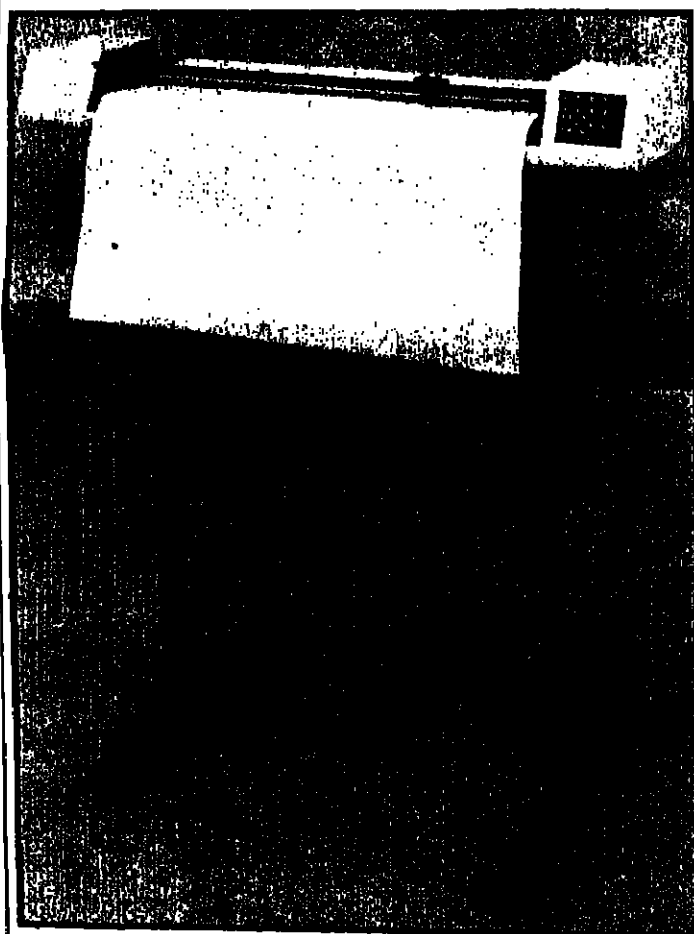
unique high-traction surface area on the drum.

Dedicated microprocessors control the motion of both pen and drum to provide almost step free drawings. A powerful instruction set, which resides in the read-only memory, enables the user to generate curves, arcs, ellipses and circles of any required size using simple one-line commands, with 11 different line types, including solid, dashed and dotted. The complete alphanumeric character set can be drawn at any of 360 possible angles and 255 sizes, either straight or italic.

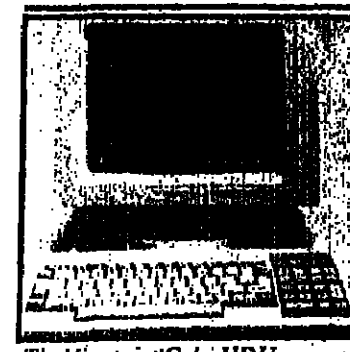
Aspect control is provided in which one or both axes of the character may be varied, and the ability to draw only a portion of a plot and to scale drawings up or down is also resident in the ROM.

Communication with the host computer is provided via an industry standard RS-232-C interface. The plotter will perform reliably at user-selectable baud rates ranging from 110 to 9600.

Sintrom Electronics (CW), 14 Arkwright Road, Reading, Berks. Tel: (0734) 875464.



The DMP-42 drum plotter from Sintrom Electronics.



The Viewpoint Color VDU.

Colour VDU plug-compatible with monochrome systems

DATA DYNAMICS has announced the ADDs Viewpoint Color VDU which has plug compatibility with ADDs Regent 40/60 and ADDs Viewpoint 60 VDUs.

The 13in screen has a P22 colour phosphor and displays the industry-standard 24 lines of 80 characters.

A seven by eight matrix character format is employed which is superimposed on an eight by 10

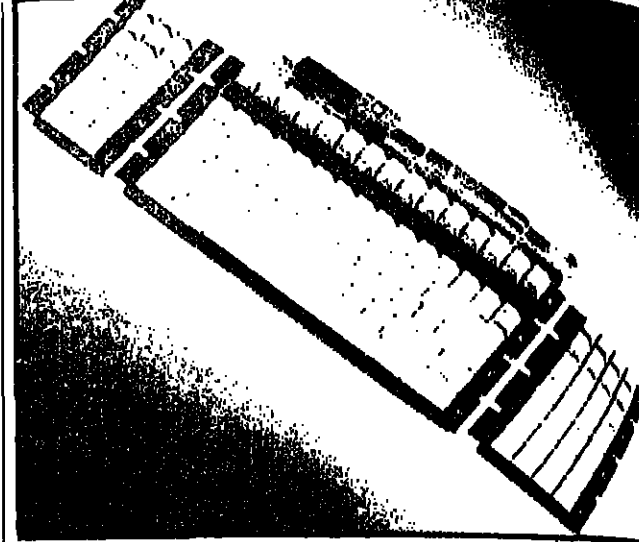
matrix for true ascenders and descenders. A 25th status line of 80 characters is standard.

The low-glare screen can be tilted through 360 degrees and can be tilted over a 19 degree range to minimise reflections and enhance operator comfort.

There is a choice of eight background and eight foreground colours which can be individually selected from a palette containing

red, green, blue, yellow, cyan, magenta, white and black.

The angle of the separate low-profile keyboard can be adjusted over a 20 degree range to suit the individual operator. Apart from a 56-key typewriter style section there is a 14-key numeric cluster, a cluster and eight function keys that can be user-programmed to provide 16 separate functions.



Multi-option keyboard from Cherry Electrical.

Multi-option keyboard offers 12 layouts

A NEW keyboard concept called the multi-option keyboard, designed to meet the demand for customised keyboards using off-the-shelf standard modules, is introduced by Cherry Electrical.

Cherry's marketing director, Robin Brewer, says this approach allows designers to obtain custom keyboards without incurring the heavy costs of a true custom design and is aimed at low volume keyboard users who have difficulty obtaining a standard keyboard to fit their exact needs.

The multi-option keyboard comprises three main modules which may be mixed in various configurations to provide 12 possible layout options, including qwerty, and qwerty plus special functions combined with either or both 3 x 7 or 4 x 7 keypad clusters which can be located at either side of the keyboard in various configurations.

The modules interconnect both mechanically and electrically and there is also a sophisticated

electronics package offering options such as a choice of six auto-repeat, parallel or serial, put in TTL or RS232C output format with a choice of data mats.

The multi-option keyboard is Cherry's latest generation of keyboards with a choice of flat or sculptured keycaps. The keyboard will also be available shortly with low profile capacitive keyswitches.

The qwerty module offers 61 keystrokes including a shaped key and a further 13 function keys, eight of which are illuminated. These keyswitches are populated or depopulated to meet the user's exact requirements.

In addition, the parallel option lines can be tri-state under control while up to eight lines can be controlled remotely by the user.

Cherry Electrical Products (CW), Coldharbour Lane, Borden, Kent ME10 2JH. Tel: (05827) 63100.

A record of what is being sold—and when

A NEW point-of-sale data collection terminal, the QS5500, from Quality Systems International, offers a sales, stock movement and administrative record.

While the system is primarily designed to provide management information, the terminal looks like a conventional cash register, and "reads" the operator through sequences for all transactions.

This is achieved through the terminal's 40 character alphanumeric display, each side of which can function independently of the other, so that for the customer, selected information or a message can be given.

To help speed transactions the credit card reader is motorised. It can also detect "hot" cards.

A data well, integral in the terminal, automatically records all details from cordless bar code wands.

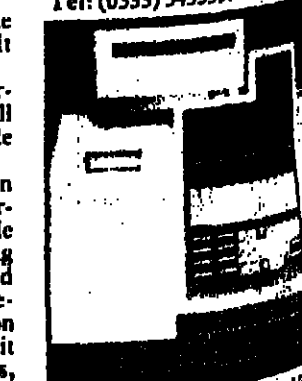
As a management information system, using magnetic data cartridges and non-volatile bubble memory, it records what is being sold, when, at what branches and how fast. It calculates, prints results and can show the information on its alphanumeric display; and it records branch level transactions, staff performance and can be coded to identify both operator and sales assistant, should the two

functions be carried out by different people.

Often it is necessary to print the method of payment for each sale, and the QS5500 differentiates between cash, cheque, credit card, long-term agreement and gift voucher. It also records goods returned, part exchanged and goods to be invoiced.

All transactions are printed on an integral high speed 80-column printer, the same data held on the terminal's memory.

Quality Systems International (CW), Imperial House, 180 New Walk, Leicester LE1 1PA. Tel: (0533) 543553.



The new point-of-sale terminal from Quality Systems International.

Extending computer to the floor

Using the Intecolor 2405 colour terminal and three programs written to take advantage of its colour capabilities, Climax Computer Corp of California has developed Sunline Color Software.

A. This is the first of three planned colour software packages.

The Intecolor 2405 provides eight displayable colours and costs \$2,850.

Climax Computer Corp (CW), 22982 La Cadenas, Laguna Hills, Calif. 92653. Tel: 714/855-4452.

There are a number of data transmission and reception modes including the standard local, conversational, and block modes;

Data Dynamics (CW), House, Clayton Road, Middlesbrough. Tel: 01-448 9781.

PRODUCTS

Telex links to word processor

A FACILITY which enables Puma telex terminals to be linked to word processors or computers is announced by Trend Communications.

A telex message can be typed directly into any word processor, computer or electronic typewriter with V24/RS232C communications interface. It can then be transmitted at up to 300 bits per second into the Puma's memory. Once it is in the memory, a telex operator can add the dialling information and send it over the telex network in the normal way.

Similarly, an incoming message can be transferred from the Puma to the office system by a reversal of the above method. All ITAS characters can be loaded into Puma, but only those with a direct ITA number 2 equivalent can be output to the telex network. An exception is that lower case letters are converted to upper case.

The originator of the telex is able to check the message at source, ensuring that the telex is sent out accurately, thus eliminating errors which might have been introduced through the telex operator re-typing it. This also allows the telex operator to carry out other duties.

A local workstation can be linked to the Puma over a distance of up to one kilometre. Originators of a message may be in departments spread around the organisation or even in a different building. By using the Puma workstation link, considerable time is saved by removing the need for sending the message by internal mail or hand carrying by the originator, says Trend.

Trend Communications (CW), Knaves Beech Estate, Loudwater, High Wycombe, Bucks HP10 9QZ. Tel: (06285) 24977.

Non-glare display

LEAR Siegler's ADM11 display terminal is now available in the UK from Peripheral Hardware.

The unit offers Lear Siegler's Dumb Terminal functions, and costs £540, although dealer and systems house discounts are available.

The ADM11 has a non-glare, green display which tilts and swivels to suit the operator and office lighting. The separate keyboard, with sculptured keys, also tilts.

There are eight programmable functions, an auxiliary RS232 port for a dedicated printer, plus communications speeds of up to 19,200 bits a second.

Peripheral Hardware (CW), Unit 12, Monkpath Industrial Park, Highlands Road, Shirley, West Midlands B90 4NY. Tel: (021) 745 3033.

Colour for Pick users

A WORKSTATION including software and a colour graphics terminal is now available that offers to the 20,000 Pick users the advantages of colour in management graphics, spreadsheets and word processing.

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The 3M Whisper Writer includes the telex printer, keyboard and acoustic coupler—all in a briefcase.

New communication moves—no louder than a whisper

TELEPRINTER, electronic mailbox or DP terminal, telex access—these are facilities included in one low-cost unit, the 3M Whisper Writer.

The opening up of the communications market following the relaxation of BT's monopoly has allowed 3M to introduce this new development to the UK market.

The 3M Whisper Writer is a desk-top communications terminal, no bigger than a small portable typewriter, with some innovative features.

It is quiet in operation, easier to use than the normal teletype terminal and considerably faster, says 3M. It will sit on an office desk but can easily be carried to almost any location.

It plugs in to a standard telephone jack or can share a line with an existing telephone.

The Whisper Writer is available in a number of configurations.

Units can incorporate either an integral V21 modem for direct connection to a telephone line or a standard V24/RS 232 interface for external connection to a hard-wired or acoustic modem.

It is also available packaged in an executive case with an integral acoustic coupler enabling the terminal to deliver instant information from customers' offices, hotel rooms, or anywhere the user has access to a telephone and power. It may be used alone as a receive-only printer or the intelligent keyboard can be added for full communications capability.

The Consultant features the 16032 as its CPU, and is based on a series of cards linked via the VME bus. The machine includes 512 Kbytes of memory, which is expandable to 1.75 Mbytes internally or 16 Mbytes externally, and incorporates a removable cartridge disc drive with 5 Mbytes of fixed storage and 5 Mbytes of removable storage. Demand paged virtual memory and multiprocessor capability are incorporated.

Other features of the Elite Consultant include high-resolution graphic capabilities and comprehensive software support.

Hi-Tek Distribution (CW), Trafalgar Way, Bar Hill, Cambridge CB3 8SQ. Tel: (0954) 81931.

Extending computer to the floor

ERICSSON Information Systems has introduced Mimer II, an advanced materials and production control system designed to run on the new System 2500 family of systems.

Mimer II extends the computer to the shop floor by using simple menus and instructions. The user is guided step-by-step through procedures designed for the way the staff work, not the way a computer works.

It offers special features, including a "What if?" function, which gives requirements planning and scheduling on different production plans or forecasts; full text facilities within structures and routes; and supplementary functions, such as ABC analysis, calculations of turnover rate, economic order, order point quantities, manufacturing lead times; "follow-up" re-

ports on production quality, rejects and work centre productivity.

It is fully integrated with Ericsson's range of accounting packages, providing complete financial and operational control for the first time within one system, says Ericsson.

Ericsson Information Systems (CW), Swan Office Centre, 1508 Coventry Road, Birmingham B25 8BN. Tel: (021) 707 3050.

Messages may be sent direct from the keyboard or typed into an offline memory, edited and then transmitted. The memory has more than 4,000 characters, about three typed A4 pages.

When used for point-to-point electronic messaging Whisper Writers can communicate with each other or with other compatible terminal units over ordinary telephone lines at 300 words per minute—much faster than voice communication and five times faster than telex.

The direct phone line connection provides automatic answer and unattended receipt.

3M Business Products Division (CW) 3M House, PO Box 1, Bracknell, Berks. RG12 1JU. Tel: 0344 58473.

The Elite Consultant is a powerful desk-top system which uses the latest National Semiconductor 16032 microprocessor. It is suited for use as an engineering workstation in areas such as software and hardware development, CAD/CAM and artificial intelligence, says Hi-Tek Distribution.

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Hi-Tek Distribution (CW), Trafalgar Way, Bar Hill, Cambridge CB3 8SQ. Tel: (0954) 81931.

Into printer market

SILVER-REED has entered the personal printer market with two thermal multi-printers which can be used with either plain paper and a thermal ribbon or thermal paper and no ribbon. Both can also be interfaced to serve as inexpensive printers for most minicomputer systems.

The Silver-Reed EXD15 features a high density 31x24 dot matrix printing head which produces high quality print in a choice of six styles—roman, bold, double density bold, enlarged (double width), automatic underline and shadow.

The Silver-Reed EXD10 will run off a mains or battery power supply, is virtually noiseless in operation and weighs 3kg.

Silver-Reed (CW), 19-23 Exchange Road, Watford WD1 7BB. Tel: (0923) 45976.

Secretarial typing or management staff no longer need to leave their desks to generate telexes, and no longer require the production of punched tape, says WordNet.

The user reaps the benefits of combining word and telex processing procedures. The TelexNet offers powerful editing features including character/line insertion and deletion, word wrap, tabula-

tion and sending memory. The text may be prepared in advance before transmission to ensure greater accuracy.

In addition to all the valuable text processing functions TelexNet provides automatic date and time insertion routines as well as control of automatic dialling and recall in the event of a busy line.

A major advantage of the TelexNet service is the improved speed. After a pause of a few seconds the terminal is open to receive text from the communications port or keyboard at the same moment as automatically transmitting stored data. A special split screen facility allows the user to observe messages in the process of generation.

A line display field, showing 14 of the 560 lines, at the bottom of the video screen is allocated for message preparation, while a five-line screen area shows incoming messages, and these may be received simultaneously.

Other special features include automated dial and re-try facilities. Prices for a basic TelexNet configuration start from £5,710.

Wordnet UK (CW), Gillingham House, 38/44 Gillingham Street, London SW1V 1HU. Tel: 01-630 5351.

Typewriters are used to input text

WORDNET has expanded its product range with a system for Telex users, called TelexNet. It offers a configuration in which up to eight typewriters and/or any terminal keyboard can be used to input text at any one time.

Text typed by the typist is captured on the central processing unit, which can be situated one kilometre from each typewriter. The information can then be retrieved onto the telex terminal where it can be edited prior to being transmitted.

The TelexNet system allows any members of staff the scope to create telexes from their own typewriter keyboard. No special training is required and the input of the telex message is almost immediate, as is the production of "hard copy" of the message, from the typewriter.

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 **Contact: The Managing Director,**
Electronic Brokers Ltd, 61/65 Kings Cross
Road, London WC1X 9LN. Tel: 01-278 2841

Electronic Brokers Ltd

TV RS232C compatible, but built to ANSI x 3.64 interface standards
This version's terminal offers:

- Mono-style set-up
- Non-volatile memory
- 12 user-programmable function keys
- Programmable column tabbing

V400 **£580**

This smart editing terminal is based on the Z80 micro and also built to ANSI x 3.64 standard. It offers both conventional and buffered transmission modes with independent transmit and receive rates up to 19,200 bps

- Comprehensive editing function
- Multiple field definition
- Three character sizes

V550 **£900**

This sophisticated screen offers a high resolution (768 x 584) display. Compatible with software such as PLOT 10 * DISPLA SAS GRAPH and D1300 GRAPHMAKER

- Emulates Tektronix 4010/4014
- DEC VT 100 protocol compatible
- Extensive graphics capabilities include vector and rectangle draw
- Block-mode transmission with full editing features
- Complies with ANSI x 3.64

Made by Visual Technology, all three terminals are made to the highest engineering standards, and come backed by Pragma's reputation for quality and reliability.

Only limited numbers available - please contact Mrs Terri Collins at 0923 720326 immediately for full details.

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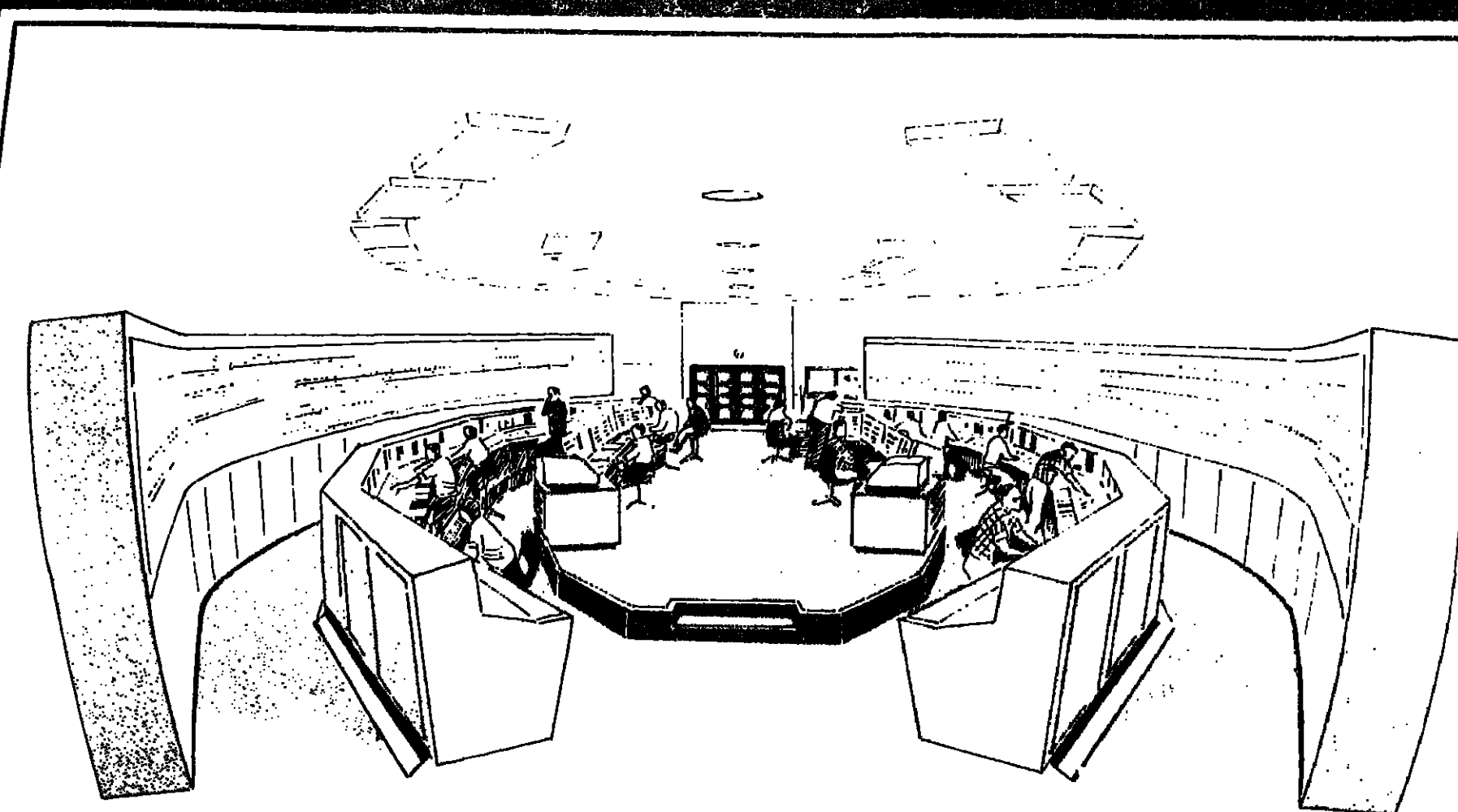
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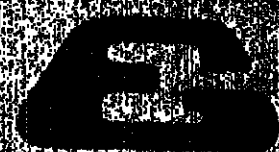
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Midas touch for job-seekers

Plenty of good jobs wait to be filled, but finance companies are looking for the best says John Kavanagh

MONEY talks, so they say — and just now it is saying some attractive things to computing staff. For much of the finance industry — banks, building societies, insurance firms and other financial institutions — is going through a period of technological change which offers some rewarding challenges to ambitious people.

Add to this perks such as cheap mortgages, plus the demand from top consultancies for people with finance industry experience, and suddenly the idea of a job with a bank or building society does not seem so staid after all.

The finance business is now an exciting one to be in for computing people. Banks and building societies in particular have found themselves competing head-on in the last couple of years as banks have moved in on the home loans market and building societies have started offering more current account facilities, including cheque books in some cases.

This battle has a big prize at the end: the general public's money. For the British are the great unbanked. About half the working population is still paid in cash, compared with 1% in the US, 2% in France and 5% in Germany.

Banks say companies can save £25 per employee by getting them to take monthly payments through a bank account instead of weekly cash pay packets.

The pay of half the people with jobs is quite a sum, and worth fighting for. And one of the main weapons the finance industry is using is high technology.

Building societies are considering installing self-service auto-teller machines to offer the same round-the-clock withdrawal facilities as banks, plus services such as cash deposits and enquiries through the same terminals.

The societies have gone a long way in discussing a nationwide network giving any investor access to his building society account through any other society's auto-teller machines. Banks have already made progress in this area, with the main banks getting together in consortia to offer similar joint facilities.

Such moves as these add up to some challenging development work in both communications and mainframe applications. Meanwhile other development areas are coming back to life this year after a freezing of new work when the recession started to bite.

"There's been quite a lull, but things are definitely picking up now," said Simon Koning, senior consultant at Targa Computer Recruitment's City office.

"A lot of insurance and banking companies have fallen back in development and they are now realising they must do something about it. They recognise that a good DP

set-up can drive a company along.

"There are some big shake-ups going on. Some companies in the finance industry are looking for complete teams of people. One big US firm is recruiting 60 people, from data prep staff to systems analysts."

These comments were borne out by two leading insurance firms, which preferred not to be named. Both were starting to look for staff

There are some big shake-ups going on. Some companies in the finance industry are looking for complete teams of people. One big US firm is recruiting 60 people, from data prep staff to systems analysts.

again this year after a recruitment freeze.

"We're expanding our DP development area because we have a long list of big things to do, especially in online systems," said one company.

Koning said there were plenty of good jobs around, but finance companies tended to want the best people.

"Once you're in banking or insurance and have got a good grounding it's easy to move around — but it can be difficult to get in if you're coming from the commercial world," he said.

One of the insurance companies

said it looked for at least two A-levels for programming jobs. Operators had to have five O-levels as an absolute minimum. The other company said it went mainly for graduates with at least A-level mathematics. It was looking for eight programmers this year and more than 12 analysts. It also wanted half-a-dozen or more experienced people for jobs such as project leader.

Koning knew at least one bank which only took graduates. But most companies used the all-purpose "good academic background" in their job advertisements, he said.

As he put it: "Banks and insurance companies and so on ap

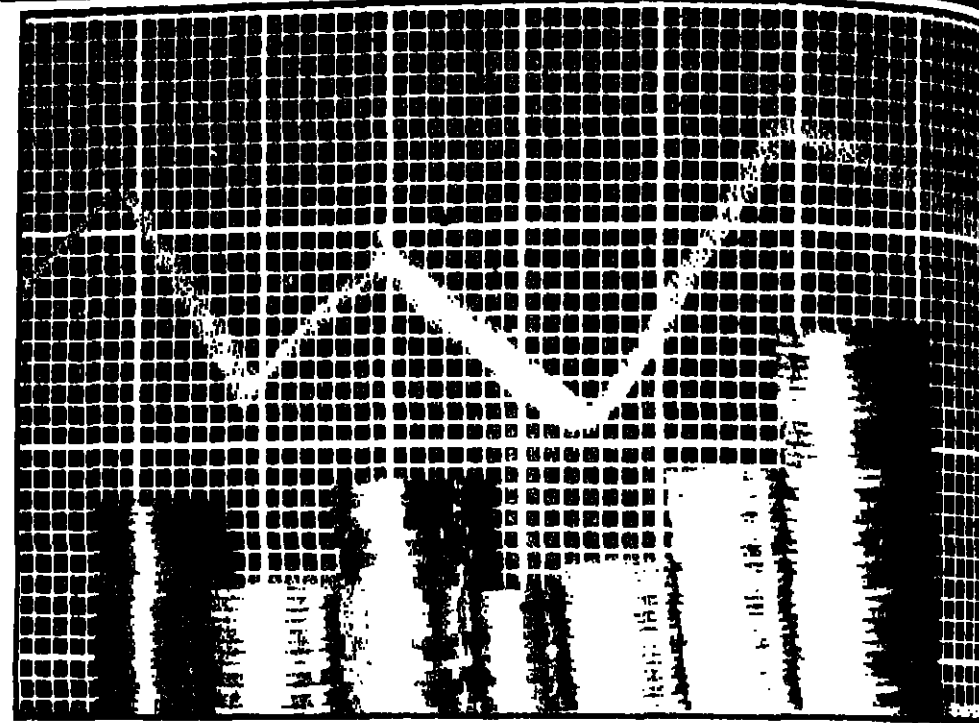
preciate good staff and do a lot to keep them."

By no means all the jobs are commuting into London. Just the programmer, analyst or operator seeking a job in the finance world can choose between capital and any one of a large number of pleasant parts of the country. Many companies in the industry moved their administrative and computing centres to London in the mid- and late Seventies. They were not so strained by a need to move to industrial centres, so they picked more choice spots in the country or on the coast.

"With some finance jobs background you can go on in direction you want," said Koning. "For example the top computer and management consultants are crying out for people with bank experience."

No message from the finance industry is that you have to be good to get in.

precipitate good staff and do a lot to keep them."



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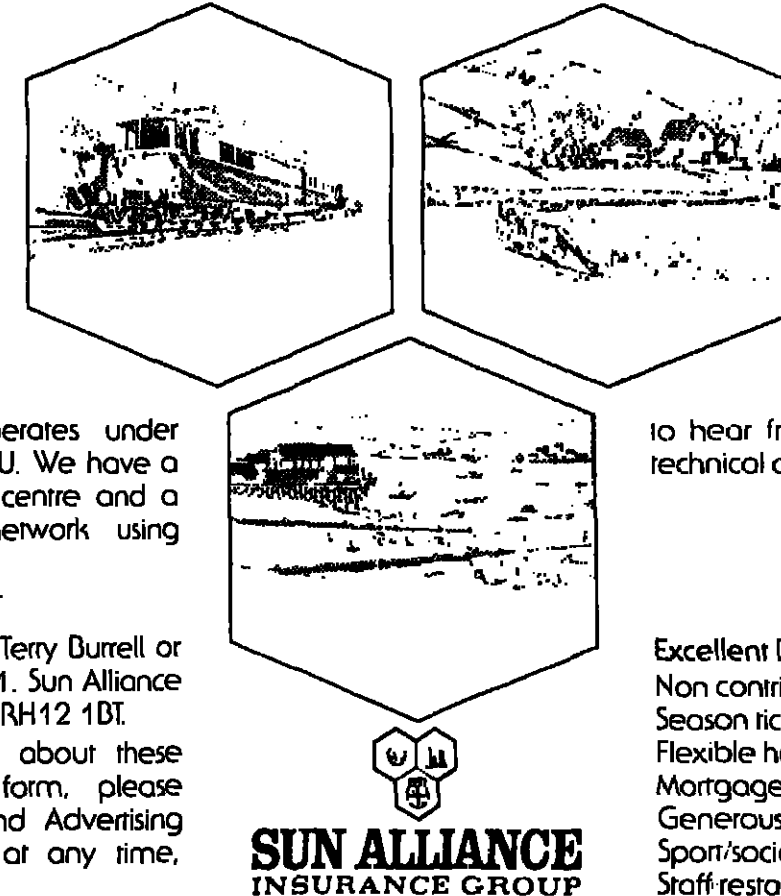
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ACTION

For an informal discussion, please ring Terry Durrell or John Gully on Horsham (0403) 64141. Sun Alliance Insurance Group, North Street, Horsham RH12 1BT.

For a detailed information package about these appointments and an application form, please telephone the HAY-MSL Selection and Advertising Answerphone Service on 01-629 1844 at any time, quoting ref: QEU/146.



It's in the area of distributed processing that we wish to enhance our capability, and to satisfy our expansion and development needs we are seeking programmers with a proven track record of successful application of knowledge and skill within a multiple 8100 DPPX environment using COBOL and/or ASSEMBLER. We would particularly like to hear from self-motivated people with a flair for technical design within an applications environment.

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(5730)

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Central to our applications software development is the use we make of IBM's database management system IMS - for example we have a network of logically related databases consisting of over 70 million segments. (Our IBM 3081 runs with 3380 discs using Xerox laser printers.)

But Programming at Hambro Life is also different because the company's different. Not content with its position as the country's largest unit-linked life company and one of the top 100 companies in the U.K., it is now embarking on a programme of

diversification and expansion that offers growth opportunities for everyone.

All this activity means that we need more high-quality programmers to join our young professional team. We need people at a variety of levels, with salaries ranging from:

£12500 up to £15000 plus car

We are looking for people with at least 4 years solid application programming experience, preferably in an IBM PL/1 environment (but we frequently retrain COBOL users).

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Please send me your Programming booklet and an application form.

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Salary is negotiable according to experience. Please write to: Company Personnel Manager E Gomme Limited, Spring Gardens High Wycombe, Bucks.



(5695)

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To maintain our ambitious schedule, we now need some keen men and women who can make an immediate and positive contribution to the implementation of new order processing, sales, manufacturing and financial system applications throughout the Division.

Analyst/Programmer £8,000-£10,000

You should be a capable COBOL Programmer with some analytical experience, or have the desire to develop your career in this direction. Experience of MVS, CICS and VSAM would be useful and you must possess the necessary personality and drive to work successfully within a small team involved closely with business users. Appropriate training will be provided as required.

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Opportunities exist for Systems Programmers with in depth involvement in systems generation and for Software Programmers with experience of significant software development. Applicants, qualified to degree level, will have at least 3 years relevant experience gained in a VM/VS(E) environment with exposure to TP and Data Base. Previous supervisory experience would be an asset. Employment conditions and benefits are those expected of a major company. Relocation expenses will be paid where appropriate.

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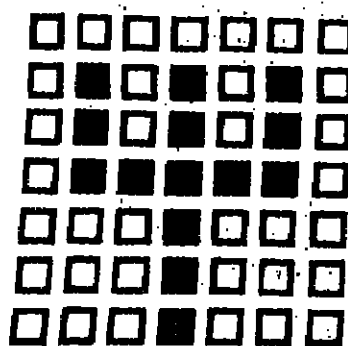
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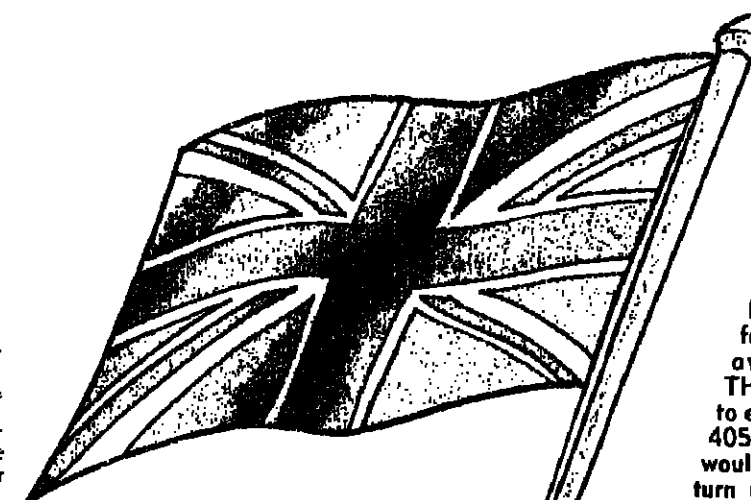
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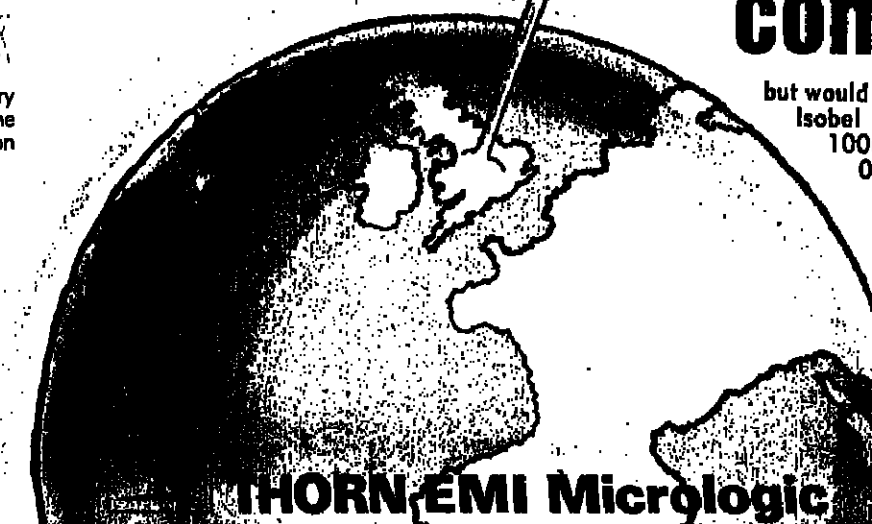
Computer Professionals



between 4.30 and 8.30 p.m. on Wednesday 5th or Thursday 6th October at our offices (two minutes from Holborn tube station) for an informal chat about the opportunities available with representatives of THORN EMI Micrologic and something to eat and drink. A telephone call on 01-405 1006 to let us know you are coming would be appreciated or alternatively just turn up on the night.

If you cannot come...

but would like to be considered, please contact Isobel Bruce or David Fletcher on 01-405 1006 (office hours), or Isobel Bruce on 01-520 5733 (evenings/weekends). Alternatively write to us including a telephone number where we can contact you.



THORN EMI Micrologic

Immediate opportunities exist for:

Responsible for producing specifications and providing technical support to the Marketing Department, the successful applicant will have a formal qualification, be articulate and have project control and systems analysis experience. Knowledge of microcomputer systems and/or retailing would be advantageous.

Senior Programmer

At least three years' real-time programming in Assembler or high level languages is required, plus experience of estimating and planning tasks through to systems test and implementation. Candidates are likely to have a tertiary qualification and be effective communicators.

Programmer

To work within the product teams. Aged up to 30, with either a degree or very relevant experience, including two-three years' real-time programming at the assembler or application level - ideally RTL/2 or Assembler and Pascal on Motorola 6809.

Isobel Bruce or David Fletcher on 01-405 1006 or write quoting Ref. No. MZ909, to Computer Professionals, 16 Red Lion Square, London WC1R 4QS

Technical problems requiring professional answers...

As one of the world's largest Money Brokers, being part of an International Group of Companies, our client is responsible for providing a complete DP service to group companies in London, Europe and the Far East. Group activities extend to Stock Broking, Bullion Broking, Financial Futures and Leasing, so efficient computer facilities are essential.

Continued expansion has created openings within their Systems Development Department in the City which houses an IBM Systems 38, IBM PC's and other Micros, from where they also support System 34 installations at group companies worldwide. Their development team is small but consists of technically competent, adaptable professionals who enjoy the challenge of their environment.

RPG PROGRAMMERS £9-12K

Two bright RPG programmers are sought to join a young team designing and developing a variety of business systems. The projects are interesting being of a financial nature and current developments include such systems as leasing, accounting and money trading. You will need good RPG programming skills with IBM System 34/38 experience, although full RPG III training will be given if required. Ideally you will be a graduate with 2/3 years experience.

MICRO ANALYST/PROGRAMMER £9-12K

This is a new position created to expand the use of micro based systems within the Group. If you have a good overall knowledge of micros including programming and design, this is an excellent opportunity to become their micro expert. You will be responsible for keeping track of developments within the micro market place and advising how these could be beneficial to the Group, but in addition you will apply your skills to developing a diverse range of commercial and financial systems for worldwide use. Ideally you will be a graduate with enthusiasm and motivation to develop this excellent career opportunity.

Salaries are highly competitive and will be reviewed after 6 months. The benefits are attractive, including a non-contributory pension scheme, LV's and private family health insurance. If you feel you can meet the challenge of working in this technically stimulating environment...

Call Jane Emmanuel on 01-734 9723 during weekdays or 01-467 2828 evenings/weekends.

CTR

Computer Technology Recruitment Limited Triumph House, 189 Regent Street, London W1R 7WD.

Systems Programmer

3M, a major international organisation with an expanding DP function, has an opening for a Systems Programmer to join their Technical Support Group at the company's Head Office in Bracknell. The current installation comprises two IBM 4341-2 and one BASF 773 operating under VM/DOS/VSE.

This is a challenging opportunity to become involved in the provision of a systems programming service to the company, and to assist in the implementation and evaluation of

computer equipment and software.

The ideal candidate will be aged between 21-30, with a minimum of 2 years' programming experience, including 1 year 370 Assembler, and at least 6 months' systems programming experience.

To apply, you should be educated to 'A' level, or preferably degree standard. Please write with full career details and current salary to Miss D Archer, Personnel Officer, 3M United Kingdom PLC, 3M House, PO Box 1, Bracknell, Berkshire.

3M

DALROTH

GERMANY & ITALY PROGRAMMERS

IBM 43 XX, CICS, VASM, ASSEMBLER/COBOL
PERMANENT & CONTRACT
SALARY/FEE'S NEGOTIABLE + RELOCATION etc.

Our client is looking for permanent and contract Programmers for ON-LINE, CICS, ASSEMBLER VSAM Program development for Manufacturing and Accounting. APPLICATIONS: The vacancies are in West Germany and Italy and the client would be particularly interested in Nationals wishing to return home. They have an immediate 3/6 month requirement for a contractor in Germany.

For further information please write or telephone

PETER MERRICK

01-493 2947 (daytime) or 390 1640 (evenings)

DALROTH & PARTNERS LTD., 4 HALF MOON STREET, LONDON W1

IBM 3083 - MVS/JES2, TSO/SPF, CICS and IDMS

Our client is a major international organisation operating in the Financial Information Services sector of the market on a worldwide basis, and is currently setting up a new centralised European computer centre. Decisions have been taken to develop a wide range of financial services for UK and European customers which involves the design and implementation of large DATABASE systems using IDMS and CICS as a TP monitor.

Immediate requirements are to recruit a number of key D.P. Professionals which will provide them with the scope and opportunity to make a significant contribution to the development of new major batch and online/realtime projects. Excellent career progression will be afforded to those D.P. Professionals who can demonstrate their skills and contribute towards these ambitious development plans.

PROJECT LEADERS

c.£15,000+
Applicants must be able to demonstrate a sound technical track record of design and implementation of large-scale batch and online database applications, with experience of IDMS or other database experience. A working knowledge of command level CICS is essential for one of the positions preferably gained in an OS/MVS/JES2 database environment. A knowledge of BAL would be an advantage, but not essential. Project Leaders are responsible for functioning systems and associated documentation.

DATABASE ANALYST

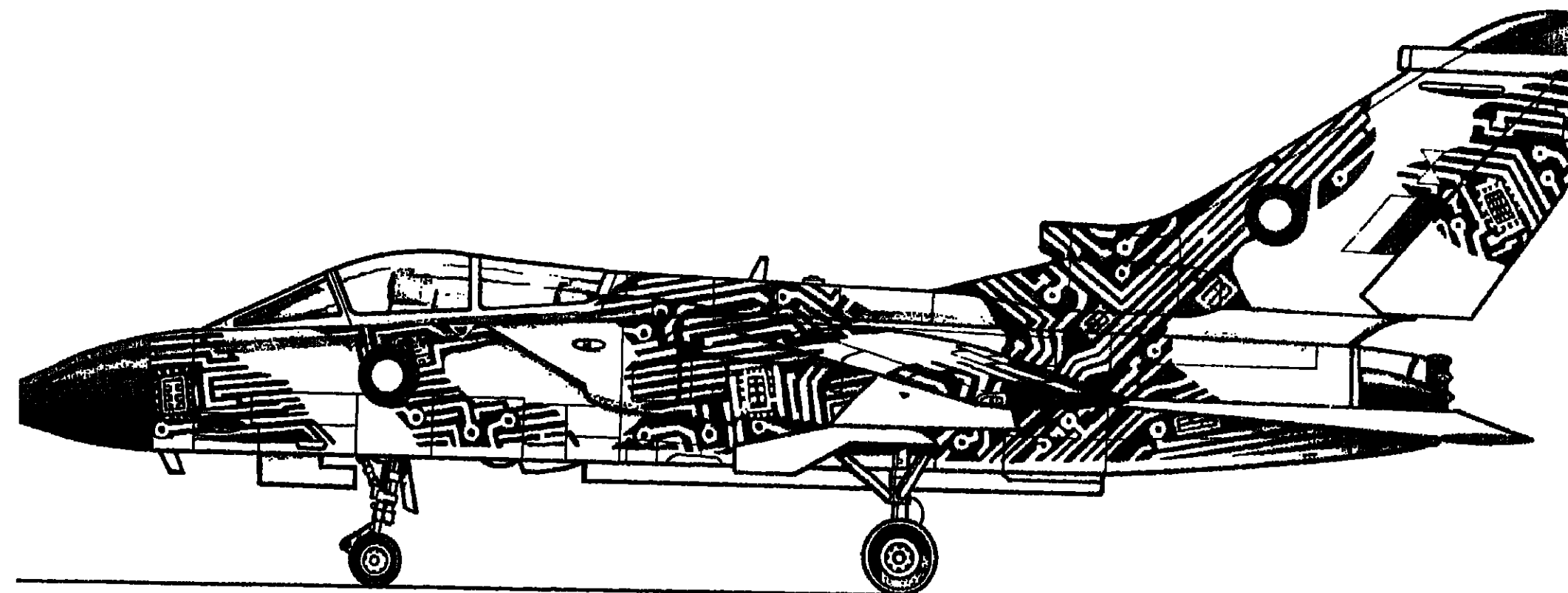
c.£14,000+
This position will suit someone with a sound knowledge of IDMS (IBM or ICL), together with a working knowledge of COBOL. The successful applicant, who will be responsible to the Database Administrator, must be able to communicate effectively at Project Manager level, and make database design decisions. Additional functions would eventually include responsibilities for staff at junior level.

If you are attracted to the challenge of these ambitious development plans, which provide the scope and opportunity for excellent career progression and generous benefits package, call IAN C. BUICK, MBS, Managing Director.



BUICK COMPUTER SERVICES
RECRUITMENT DIVISION
72 Rochester Row
Victoria · London SW1P 1JU

Tel: 01-834 0061 (24-hours)
Or call evenings and weekends
01-942 1178



Software Engineers for the world's most effective ECM systems

Control Software for the Sky Shadow active counter measures pod, arguably the most advanced ECM system to be used on operational strike aircraft to date, was developed by a specialist Electronic Warfare computing team at our Stanmore laboratories. The team is now moving on to new

projects covering the next generation of integrated EW/ECM systems and requires additional permanent staff across a broad range of software engineering technologies, from embedded microprocessors through to VAX-11 super minis.

If you can demonstrate an ability to design and develop effective and highly reliable software, then a real career opportunity may exist for you in one of the following positions: PROJECT LEADERS, TEAM LEADERS, DESIGNERS, PROGRAMMERS - Operational & Test Software, Data Analysis, Signal processing, simulation, graphics and Q.A.

Phone Jill Aplin on 01-954 2311 NOW, she'll tell you all about the work, the teams, our competitive salaries and benefits package and how you'll enhance your career by working with a company that's dedicated to technical excellence



Marconi Space and Defence Systems Ltd.,
The Grove, Warren Lane,
Stanmore, Middx HA7 4LY.

Marconi
Space & Defence Systems

PRODUCTION CONTROL MANAGER

MIDDXX. to £20,000 + Car
Our client, a large financial organisation needs a Production Control Manager to take responsibility for all aspects of Operations Production functions for a new IBM 3083 site, running under MVS/JES, TSO/SPF, CICS and IDMS. The successful candidate will have proven management and technical skills, and be capable of handling the diverse operational requirements of this large new site. Excellent career prospects and benefits apply. Ref: C1006

SYSTEMS SOFTWARE SUPPORT

UK/ABROAD £20,000+
This International Software House needs highly motivated D.P. professionals for exciting new customer support projects at home and abroad. Applicants must have three years' systems programming experience with a sound technical background of MVS/JES, CICS and other associated IBM software. The company is offering an excellent remuneration package together with outstanding career progression. Ref: A980

PROJECT MANAGER

LONDON £18,000 + Profit Share
A leading Software House needs someone with a sound knowledge of telecommunications and/or defence systems, preferably gained in a consultancy role. The successful candidate will take control of the design and implementation of medium sized projects for product development. An O.R. background would be useful. BUPA, Life Assurance and Profit Share are just some of the attractive benefits offered. Ref: D462

D.B. ANALYST X2

MIDDXX/LONDON to £15,000+
Two large financial organisations require Database Analysts with a sound knowledge of IDMS and COBOL (ICL or IBM background - MIDDXX), or IMS and PL1, CICS (London). Positions would ideally suit a Senior Analyst/Programmer, or Analyst. Excellent career prospects and benefits apply. Ref: C588

PROGRAMMING MANAGER

MIDDXX £14,000
Superior skills to lead a Programming team coupled with an in-depth working knowledge of COBOL, CICS/DLI required for this leading manufacturing organisation. Excellent salary and company benefits. Ref: B836

SENIOR ANALYST

MIDDXX to £14,000
This well-known company needs an Analyst to work within quality management and to provide technical support on proposal for TURNKEY projects using various machines. At least four years' experience in the implementation of project systems is required. Exceptional working conditions, car allowance and free BUPA are just a few of the many attractive benefits available. Ref: D620

PROJECT MANAGER

HERTS to £14,500
At least seven years' appropriate computer experience, preferably with a knowledge of BURROUGHS. Experience of large companies systems development, staff control and some programming knowledge is essential. Excellent career path plus benefits guaranteed. Ref: D882

BAL PROGRAMMER

KENT to £11,000+
Leading manufacturing company needs an IBM-ASSEMBLER Programmer to take part in the development of online commercial systems using SHADOW. Knowledge of COBOL an advantage. The company is also seeking a Systems Analyst to take a leading role in the design and development of these applications. In an IBM DOS/VSE, SHADOW environment. A knowledge of BAL and/or COBOL would be useful. Excellent benefits include N.C. Pension, subsidised lunches, and a complete range of sports facilities. Ref: C1018



BUICK COMPUTER SERVICES
RECRUITMENT DIVISION
72 Rochester Row
Victoria · London SW1P 1JU

Tel: 01-834 0061 (24-hours)
Or call evenings and weekends
Ref. A: 01-318 2700
Ref. B: 01-784 8937
Ref. C: 01-942 1178
Ref. D: 01-310 0482

H.P. 3000 PROGRAMMER/ANALYST SURREY £13,000 + Bonus
Test team H.P. 3000 COBOL experience together with a knowledge of Material Management, IMAGE and QUERY are required by this international manufacturing organisation. The successful applicant will be assigned to the development of a major project involving transferring existing systems over to MM, system support and extensive customer liaison. Excellent benefits and career prospects apply. Ref: A978

NCR PROGRAMMERS AND ANALYSTS

to £13,000 + Mortgage
Leading Banking organisation, based in London, needs programmers with a minimum of two years' COBOL work on the development of online financial systems in an NCR R250/R555 environment. Two Systems Analysts with banking or other financial experience are also needed to develop major new applications. A programming background would be useful but not essential. Ref: C108

FORTRAN SPECIALISTS

to £12,500 + Bonus + Relocation
Programmers and Analysts/Programmers are urgently needed in the London/Home and Southern Counties to join existing development teams, working on a wide variety of application areas, i.e. scientific, research, engineering and commercial applications using mainframes and minis, e.g. IBM, DEC, HEWLETT PACKARD, DATA GENERAL etc. Excellent prospects and benefits include BONUS schemes, BUPA and RELOCATION, where necessary. Ref: C581

RPG 3 PROGRAMMER

MIDDXX c. £11,500
Ideally the successful applicant will have a minimum of 12 months' RPG 3 expertise to work on a variety of projects within the Software House division of a large manufacturing organisation. Ref: B68

PASCAL PROGRAMMER

LONDON to £11,500
A well-known telecommunications organisation requires someone with two years' PASCAL experience generally gained on DEC/VAX equipment. The successful candidate will be involved in the development of new and enhancement of existing systems. Excellent career prospects and benefits apply. Ref: 0704

ASSEMBLER PROGRAMMER

N. SURREY £10,000+
Our client, a leading financial organisation requires programmers with at least two years' IBM ASSEMBLER expertise preferably with a working knowledge of CICS, to meet their demands for new extensive development projects. Ref: B85

JUNIOR RPG 2 PROGRAMMERS

(TRAIN IN RPG 3) HERTS c. £10,000

A leading manufacturing organisation requires Programmers with a minimum of 12 months' RPG 2/System 34 experience to train on their recently installed System 38 using RPG 3. Successful applicants will be part of a team developing new financial and manufacturing applications for the company's European network. Many fringe benefits together with extensive European travel are offered. Ref: A98

COBOL PROGRAMMER

W. COUNTRY c. £9,000 + Relocation
Our client, a leading name in the retail industry is seeking to recruit someone with two years' COBOL experience to develop commercial applications on their ICL 2976 using VME/8. A structured career path together with large company benefits are offered. Ref: A1018

IBM OPERATOR (DAYS ONLY)

LONDON c. £8,000
Our client, a leading manufacturing organisation, requires someone with sound DOS/VSE CICS experience to solely supervise their 4341. A working knowledge of systems programming is highly desirable. Ref: B1010

CONTRACT OR PERMANENT

The D.P. Professional's choice of software house

In just nine short years we have grown into a respected force in the international systems and software world. Now, with offices and work locations around the globe, our services are in demand by many major commercial organisations. This is the background to our need for more D.P. Professionals to join our team and play a vital role in our continued success.

Specifically we would like to meet:

IMS DB AND/OR DC NOMAD TANDEM ICL ME28 IBM S/34, RPG11 DG MV8000, DEGREE VM OR MVS HP3000 FORTRAN PDP11, RSX11 IBM PC ICL EXPERIENCE ICL 2900, COBOL, TPMS SYSTEM 12/40 MESSAGE SWITCHING	Programmer/Analyst Programmer/Analyst Programmer/Analyst Analyst, Programmers Programmer/Analyst Systems Programmer Programmer/Analyst Finance Specialist Analyst Programmers Systems Engineers	Surrey Surrey London London London/Essex Scotland Home Counties London London London London N. London
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Contract or permanent, we can offer you the range of positions and applications to broaden your technical expertise and enhance your career advancement into project management and beyond. We can also offer you excellent salaries plus the full range of benefits associated with a successful software house, including the opportunity to work on challenging projects throughout the UK, Europe, Middle East and possibly the USA.

Please contact:
TANGENT COMPUTER SERVICES LTD., FAIRFIELD HOUSE, FAIRFIELD ROAD,
BRENTWOOD, ESSEX CM14 4LR. TEL: BRENTWOOD (0277) 255755.

tangent
success in the Software world



Programmers. Systems Designers. Development team leaders. Is your potential being wasted?

In fourteen years Logica has become one of the world's leading service companies in real-time computing, communications and office automation, initiating new technological developments in each of these fields. In 1983 Logica was judged by industry leaders, brought together by Computing magazine, to be the UK company which has made the greatest contribution to International Technology during the past decade.

Banks and other financial institutions have many of today's most sophisticated communications systems. The most recent developments in information technology open up a whole new range of opportunities for new and enhanced systems in areas such as funds transfer. Logica's Finance Group is at the forefront of these developments. Due to expansion of this highly successful group, we are looking for additional talented people:

Systems Designers **to c.£15,000**
with more than four years' experience in the design and development of mini or main-frame TP/communications systems, on PDP, VAX, Tandem and IBM equipment.

Development Team Leaders **to £13,000**
with four years' experience in message switching, communications networks and EFT, or alternatively good mini/micro real-time programming.

Programmers **to £10,000**
with at least two years' experience in real-time systems, ideally including message switching, communications networks and EFT.

To apply your knowledge in a market sector dependant on the latest technology, please call Jennifer Williams on 01-636 5454 or write to her at Logica Limited, 64 Newman Street, London W1 (quoting ref: FG/12).

logica

your appointments register

Programmers

NCR/IBM/COBOL to £15K
Insurance/Banking London/H. Counties/N. Eng.COBOL/PL1/OS/CICS/IMS to £13K
Commercial H. Counties/Midlands/ManchesterDEC/PDP 1170 to £11K
COBOL SurreyASSEMBLER ON POPULAR
MICROS to £35k + Royalties
Games Writers & Designers
London/Slough/LiverpoolIBM/MVS to £15K
IMS/CICS/DL/1 Middx.SYSTEMS 34/36/38/RPG2 to £12K
Insurance/Commercial London/Home CountiesIBM to £16K
System exp. EssexBASIC to £15K
Mini/Micro Computers LondonIBM/UNIVAC/COBOL to £12K
On-line/Database SurreyVAX & IBM SYSTEMS to £11K
Fortran MVS/TSO South Yorks.

Analyst/Progs

PRIME CAD/CAM to £11K
Home Counties/E. AngliaIBM 34/38/4341 to £15K
London/Home Counties/NorfolkICL 1500/ME29/2903 to £12½K
COBOL Essex/HertsIMAGE PROCESSING C/UNIX to £12K
Scientific Applications

Hardware/Support

APPLICATIONS ENGINEER to £15K
Peripherals Support/Microprocessor Systems
London plus International TravelCUSTOMER SUPPORT to £10K
Basic HampshireSUPPORT ENGINEER to £17K
VAX 780/780 UK & EuropeEXPD. SOFTWARE TECH. AUTHORS £ NEG.
Datacomm/Operating Systems/Telephony/etc.
EuropePROJECT ENGINEER to £11K
Systems/DEC Beds/ManchesterSOFTWARE SUPPORT £ NEG.
Medical/Training/Technical Berkshire

Systems Analysts

PERKIN ELMER to £14K
On-Line/Database Systems MiddlesexCAD/CAM to £16K
Real time/Modelling Man/Essex/South WestIBM/BURROUGHS to £15K
Commercial Accountancy London/Surrey/ManchesterIBM/PL1/DL/1 to £11K
Database Support Middx.ICL/ME29 to £16K
Commercial Design HertsIBM SYSTEM 34/38 MAAPICS to £13K
Sussex

Software Engineers

CORAL/PASCAL/MASCOT/C to £13K
Communications
Glos/H. Counties/Midlands/BlackburnASSEMBLER/PLM to £12K
Northern EnglandMILITARY SYSTEMS/RADAR to £14K
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Telecomms - ATE Dorset/Surrey/London/KentCOMMS/TELECOMS/MOD to £14K
Mini/Mainframe E. AngliaHP3000/INTEL to £12K
CAD/CAM/ATE Home CountiesHPA 900/RTE A1 to £13K
Biotechnology Process Control London/Wilts.

Snr Appointments

PROJECT LEADER to £15K
Military Systems Berks/HantsSALES EXECUTIVES to £30K
Mainframe NationwideCONSULTANT to £15K
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Computer Modelling/Fluid Flow S. LondonICL/PRE- AND POST-SALES to £16K
SUPPORT BerksSOFTWARE SECTION MANAGER to £18K
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The Appointments RegisterSLOANGATE LIMITED
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Surrey KT2 5BA
Telex 0817 STANAN GSenior Programmer
Surrey
to £12,000

Our client is a computer services company within a well-known group, which is currently expanding to take on more development work. Group benefits include a good pension scheme and profit sharing/ productivity bonus. They have a variety of hardware which includes IBM GSD equipment, DEC (PDP-11 and VAX) and micro-computers. Experience gained in a commercial environment (accounting, payroll, personnel records) or manufacturing/production control, would be of particular interest. The systems to be developed will be both on-line and batch. In addition, you will be given the

IBM—GSD

- RPG II
- RPG III
- COBOL

opportunity to broaden your experience by implementing micro-based packages. As a senior programmer, you will already have had at least 3 years' programming experience including, ideally some supervisory experience, as you will be responsible for the technical supervision of programmers. An additional requirement will be the ability to communicate with non-technical users. Please contact Joan Ainsworth on 01-681 8311 or write to her at Computer Search & Selection, 6th Floor, Canilyn House, Dingwall Road, Croydon, Surrey CR0 9XE.

DEC

- PDP-11
- VAX
- COBOL

Computer Search
& SelectionDOLPHIN
SHOWERS
LIMITEDAnalyst/Programmer c. £10,500 p.a.
Programmer c. £9,000 p.a.
ICLME29 COBOL
LOCATION: WORCESTERThe Company:
Dolphin Showers is an expanding company in the home improvements market. We are part of Kean & Scott Holdings Ltd. which includes Alpine Double Glazing Ltd. and Sharp Bedroom Designs Ltd. Kean & Scott is a member of the Hawley Group of Companies.The Equipment:
ICL ME29 Model 37 currently running under MTS with Cobol.The Requirement:
We are seeking to employ an analyst programmer and a programmer who will form the nucleus of a new data processing department, this function having previously been carried out at group headquarters. Experience of ICL/Cobol in an on-line transaction processing environment is considered essential. Ideally candidates should also have had some ME29 operating experience.The Career:
The positions are demanding ones offering both the opportunity of being in at the start of a new department and considerable responsibility to the successful candidates. Several major development projects are in progress and we are committed to the introduction of data processing in most aspects of the Company's business.The Rewards:
As well as highly competitive salaries we offer a range of excellent benefits including pension scheme, life assurance, discount on Group products and, if necessary, assistance with relocation expenses.

Interested? Then please contact either Chris Morrow or Deborah Hallstone of Total Selection who have been retained to advise on this appointment.

Total Selection
32-49 Victoria Street
Bristol BS1 6AD
Telephone:
Bristol (0272) 216286Data Centre
Manager

City

c. £15K + car

Our client is a major subsidiary of a leading financial services organisation with a worldwide network of offices. The dramatic growth which has taken place in recent years has led to the installation of a large and very sophisticated multi-CPU mini computer system to handle the high volume of daily transactions. Plans have been approved to extend the use of data communications facilities and another powerful mini computer will be installed to handle a variety of other business activities. Application software development is handled by a Systems House.

Candidates must have in-depth experience of transaction processing installations and be sufficiently familiar with operating systems software to pin-point problem areas and to brief technical support personnel. Knowledge of the products of leading

mini manufacturers such as DEC, HP, TI, Honeywell or DG is important and familiarity with data communications equipment and techniques would be advantageous.

The achievement of a high quality of service to the user department is paramount and accordingly a sense of urgency and willingness to 'roll up ones sleeves' are vital.

Salary is negotiable and is unlikely to be a limiting factor. The successful candidate will have the opportunity to implement state of the art techniques and will be expected to influence future D.P. developments.

In the first instance contact Bruce Crammond (quoting Ref. 411) on 01-631 4184 or write to him at: A&A Consultants (Holding) Ltd., County House, 10 Little Portland Street, London W1N 5DF.

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CAREER OPPORTUNITIES WITH LEADING BRITISH MICRO MANUFACTURER

TEAM LEADER
(TECHNICAL PUBLICATIONS- INSTRUMENTATION)
£10K to £12K, OXFORD BASED

Research Machines' success in the scientific market is due to the performance and reliability of its microcomputer systems, its specialist knowledge of the applications involved, and the support it provides to users. Effective technical and user documentation is a very important part of that support.

A major expansion is planned in this market, backed by a new range of sophisticated microcomputer-based laboratory and instrumentation products. As a result we are now looking for a Team Leader to take responsibility for the production of the technical publications needed in this specialist area.

The person we are looking for will:

- help identify documentation requirements in relation to products and market needs;
- plan, implement, and progress the production of technical publications (using both in-house and external resources);
- ensure adherence to high standards of house style, quality, content, and accuracy;
- plan resources (manpower, time-scales, and budgets) for large, complex projects;
- ensure that reviews and field trials are carried out and followed up;

- contribute to the writing of individual publications as necessary.

He or she should, therefore, have the following qualifications:

- a degree;
- several years experience in user documentation in a relevant field — including specific experience in the computer industry;
- experience of both the writing and production of technical publications;
- the ability to lead a small team and liaise effectively with outside contractors, agencies, and other suppliers.

We offer a particularly attractive range of benefits including good salary; 25 days holiday; free BUPA, life and disability insurance; pension scheme; and generous help with relocation expenses.

If you are interested in this vacancy please contact Polly Keane, on Oxford (0865) 726136 or by letter, for an application form, quoting reference: TPI/CW9.

RESEARCH MACHINES
MICROCOMPUTER SYSTEMS

RESEARCH MACHINES LTD Mill Street, Oxford OX2 0BW Tel: (0865) 726136

CONTRACTS SAUDI

ANALYST/INSTRUCTOR	Background PL1/FORTRAN. TSO/SPF experience oil industry to work in training unit.
ANALYST	IBM background with experience of instructing to work with project team and assisting in training. PL1 or FORTRAN desirable.
TP SUPERVISOR	MVS/JES2 or JES3/TSO VTAM IBM 3033
BENSON PLOTTER OPERATOR/SUPERVISOR	Graphics
ANALYST PROGRAMMERS	PL1 TSO preferably SPF to work on development projects structured techniques.

All of the above are one year renewable contracts that carry tax free salaries of £18,000 to £25,000. In addition there is a month's paid holiday plus flight home. Apartments are provided free as well as tv, stereo equipment and a company car (1100 c.c. with air conditioning). Full medical facilities etc. Interviews late October - London.

CONTRACT UK

POSITION	LOCATION	NO. MONTHS
PL1 PROGRAMMERS IMS DB/DC	CENTRAL LONDON	8+
COBOL PROGRAMMERS IMS DB/DC	MANY	6+
VM SYSTEMS PROGRAMMERS	S. LONDON	6+
DPS6 ANAL/PROGRAMMERS	W. LONDON	NEG
U 1100 PROGRAMMERS JSP	SOUTH-WEST	3-6
DIGICO PROGRAMMERS/DESIGNERS ASSEMBLER	HERTS	18
RPG III PROGRAMMERS	SEVERAL	3-12
PSCAL PROGRAMMERS REALTIME	BUCKS	4+
SERIES 1 PROGRAMMER/DESIGNER ASSEMBLER RPS	CENTRAL LONDON	6+
SENIOR DESIGNER IMS DB/DC	CENTRAL LONDON	6+
ICC ANALYSTS	CENTRAL LONDON	5-24

Call Keith Duncan on (0892) 44757 or (0892) 65545 (up till 10 p.m. evenings weekends) alternatively write to:

JAMES DUNCAN & ASSOCIATES
64 Mount Ephraim
Tunbridge Wells
Kent TN11 8BG

(16780)

SALES EXECUTIVES

"The most gifted members of a group or community"

This is the Dictionary definition of Elite, and is exactly the type of Salesman we are wishing to attract on behalf of our Client. We wish to identify Salesmen who regularly achieve over quota performance and are capable of developing new business and are interested in participating in the "birth of a new product".

We are working on behalf of a major International Organisation, already tipped as a leading light in the industry and promising to be a real competitor for the

number one position. They are launching products in the UK in the next month and are looking for the elite to join a national salesforce. Specifically they wish to recruit in the Northern Home Counties, South East England, London, the Midlands, Manchester/Leeds and in Scotland.

You will be marketing a range of products that incorporates sophisticated architectural design and address the office automation area. Advanced communication protocols are

available enhancing the products marketability. You will be expected to demonstrate a successful track record of selling within the computer and office automation industry but more particularly, show the enthusiasm and drive necessary to penetrate major accounts where part of the success of this product will lie within your responsibility. With the anticipated growth our Client predicts excellent career opportunities for those candidates appointed at this early stage.

CTA
RECRUITMENT CONSULTANTS

If you are interested and wish to know more, contact **CATHY TRACEY** on 021 236 1999 (24 hour answering service) or Henley in Arden 3273 (evenings and weekends)

Cathy Tracey & Associates Ltd

PHOENIX HOUSE
13 NEWHALL STREET
BIRMINGHAM B3 3NH
TEL 021 236 1999 TELEX 825264

SILBURY BUSINESS CENTRE
356 SILBURY BOULEVARD
CENTRAL MILTON KEYNES MK9 2LR
TEL 0908 604448 TEL EX 825264

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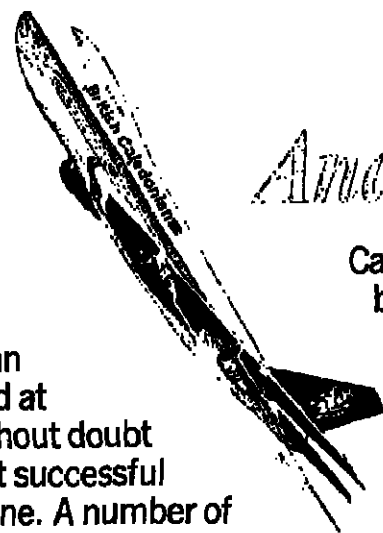
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Universal Computers Limited - sole UK distributor of ULTIMATE computers (all of which use the famous PICK Operating System) is growing ... fast. So it needs more sales and support staff to meet the increased demand for existing and new products, including a powerful new super micro (also running PICK) competing with many mini systems.

UCL turnover will exceed £4 million this year - a 40% expansion over 1982. Nevertheless UCL retains the small company atmosphere, so much appreciated by so many computer professionals, and offers real career development.

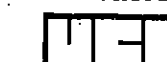
UCL requires NOW

- ★ Senior Sales Managers - earnings c£30,000
- ★ Sales Persons - on quota earnings £24,000
- ★ Technical Support Engineers - up to £12,000
- ★ Applications Support People - up to £10,000

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Contact Nick Drescher or Chris Holman - right now!



UNIVERSAL COMPUTERS LIMITED
23 PARADISE STREET SE16 4QD. Tel: 01-232 1155

ANALYSTS & PROGRAMMERS

MVS TRAINING

CITY to £13,000 pa
Multi-national organisation based in the City is strengthening its technical side. This has necessitated the need to employ good DOS/VSE SYSTEMS PROGRAMMERS. Current hardware consists of IBM 4341's, upgrading soon to IBM 3083's, which will utilise the MVS operating system, thus creating a perfect opportunity for successful candidates to migrate to MVS. This is a fast growing department offering excellent staff benefits. Ref: S1282.

CICS TRAINING

CITY to £10,000
A City-based International Bank housing 2 x IBM 4341's under DOS/VSE, with CICS and DLI. Is currently recruiting a number of PROGRAMMERS to join their MAJOR ON-LINE COMMERCIAL LOANS TEAM. Programmers with around 2 years' experience of COBOL and preferably some exposure to CICS and/or DLI, who would welcome further training in these areas should apply now. Company benefits and scope for career advancement are excellent. Ref: A1253.

ANALYST/PROGS

SW LONDON to £13,000 pa
This MANUFACTURING giant situated in South West London would like to recruit good IBM ANALYST/PROGRAMMERS, with at least 2 years programming in COBOL, and some ANALYSIS experience. They house IBM 4341 computers with CICS on-line and DLI Database. The successful candidates will have the opportunity to become increasingly involved in SYSTEMS ANALYSIS, DESIGN and OPERATIONS, and those with the potential will progress into management. Ref: S1311.

PL1 PROGRAMMERS

CITY £8-12,000
One of the largest and most successful international insurance Broking Groups based in the City are recruiting a number of PL1 programmers. Interesting on-line applications await you in a sophisticated environment consisting of an IBM 4341, Series 1 Micros and recently installed WANG VS equipment. Candidates with a good standard of education and between 2-5 years experience of PL1 programming, should apply now for an early interview. Ref: A1310.

CICS PROGRAMMERS

SURREY £10,000 + pa
Large International travel organisation have positions available for programmers with at least 2 years programming in COBOL on IBM hardware using CICS. Their computer is an IBM 4331, with a large on-line network of terminals, both remote and local. Wide range of interesting development work available covering various systems. Excellent salary and benefits on offer, generous WORLD-WIDE TRAVEL CONCESSIONS, free Life Assurance and subsidised staff restaurant. Ref: S1244.

SYSTEMS ANALYST

CITY to £13,500
This major organisation is looking for ANALYSTS to join their expanding project team concerned with developing ON-LINE ACCOUNTING SYSTEMS. Our client houses an IBM 3033 running under MVS, IMS DB/DC with communications links to a PRIME MINL. The successful applicants will have around four years' total experience, preferably gained in an IBM mainframe environment and ideally have had some exposure to minis. Opportunities for career progression are excellent. Ref: A1271.

Those are just some of the positions available. If your particular "expertise" or "ideal job" has not been advertised, then give SBS a call and discuss your career requirement with one of our recruitment team.

SBS RECRUITMENT

Scientific & Business Systems Limited
22 Bloomsbury Square London WC1A 2NS
Telephone 01-637 9541 (24 hr answering service)

TANDEM/VAX TRAINING

LONDON/H. COUNTIES to £14,000
Several prestigious companies in both Central London and the adjoining counties need experienced COBOL Analyst Programmers. Where necessary people will be re-trained on VAX or TANDEM equipment. Salaries vary according to experience, in some cases benefits will include a CAR. These clients include manufacturers, software houses and end-users. Applicants must have commercial D.P. experience, but ANY hardware background will be considered. Ref: 1085.

ANALYST/PROGS

CITY c. £12,500
This well known INTERNATIONAL BANK located in the city are currently recruiting BASIC Analyst/Progs. Candidates should have a minimum of 2 years programming experience, and preference will be given to people with a knowledge of PDP hardware. Benefits include subsidised mortgage, season ticket loan, pension etc. TRAINING on VAX will be given. Opportunities are also available for Senior A/P's to move into project management. Ref: F1135

PROGRAMMERS

BERKS/SURREY c. £12,000
Companies in the above areas have engaged our services to recruit experienced DEC programmers. Candidates should have commercial experience in FORTRAN, MACRO or BASIC+. This is an ideal opportunity for those with experience of real-time systems to advance their careers. EUROPEAN travel will be necessary in some cases. Ideal candidates should have knowledge of RSX11 or RT11 but training will be provided. Ref: F1247.

CICS TRAINING

CITY £8,500-£11,000 pa
Our client is a prestigious city-based FINANCIAL institution embarking upon a major expansion programme. They now need to recruit 2 to 3 IBM COBOL PROGRAMMERS, with 12 months to 3 years experience. The company's configuration consists of 2 IBM 4341 Mainframes, utilising DOS/VSE operating system. Knowledge of CICS on-line programming would be useful, but training will be provided where necessary. Excellent staff benefits are on offer. Ref: S1033.

SNR ANALYST/PROGS

LONDON to £15,000
A prestigious company located in London, wish to engage a Senior Analyst/Programmer. Applicants must be ready to move rapidly to the post of Project Manager. Candidates should be able to show a background of programming and design. A knowledge of financial/accounting or order processing systems is desirable but not essential. Top salaries are available and benefits packages are negotiable. MIN/MICRO experience highly advantageous. Ref: F1116.

SNR ANALYST/PROGS

ESSEX to £13,500
Our Client, one of Britain's largest Investment Services Organisations are currently recruiting a Senior Analyst/Programmer to become involved in the development of a new insurance and Pension Scheme. The current configuration is two IBM 4341's under DOS/VSE with COBOL, CICS and VSAM. Experienced Analyst Programmers, preferably with some exposure to CICS, who would welcome the opportunity to further their careers in a progressive environment, should call now. Ref: A1312.

CONTRACTS

IBM SYSTEM 34 RPG II ± COBOL
ANALYST PROGS

LONDON

DEC DIBOL CTS 500 ANAL/PROG

KENT

IBM COBOL IMS DB/DC ANAL PROG

SURREY

IBM SYSTEM 38 RPG III ± MAAPICS
ANAL/PROG

SUSSEX

For further details contact NICK POLE AND TLP

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To £18,000+ benefits & expenses

Due to rapid growth I need an experienced interviewer to join a very successful company. I would like:

- A professional who regards the service they give as being more than just a job.
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- A consultant who likes to develop close links with both applicant and client.
- A consultant who recognises the importance of interviewing applicants and assessing them technically.
- A consultant who appreciates back up facilities including our own telex and on site a System/34, a System/38 and soon a System/36.

I promise no mail-shots, no targets and I do promise a huge client base, a great many applicants and a very professional service.

Call me, Richard Milsum on 01-354 1055 during office hours or on 01-958 2553 in the evenings and at weekends.

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COMPUTER 01-354 1055
RECRUITMENT LTD

OPPORTUNITIES AT CSP

Computer Systems & Products, the fast expanding Nottingham-based systems and software house has the following opportunities:-

- **PRE-SALES SUPPORT SYSTEMS ANALYST**
Based in Nottingham DEC experience preferred Ref: R.V. Gutteridge.
- **SENIOR FIELD SERVICE ENGINEER**
Based in Winchester. DEC experience preferred. Ref: R.C. Gould
- **FIELD SERVICE ENGINEERS**
London, Winchester and Nottingham areas. DEC experience preferred. Ref: R.C. Gould

These positions represent worthwhile opportunities in a go-ahead company with excellent working conditions. A first class remuneration package is offered including BUPA, Life Assurance and usual fringe benefits.

Write with full career details to date.
CSP Barrasford House, Goldsmith Street, Nottingham, NG1 5JY.
Tel: (0602) 415155.

DIPS 6 Technical Support

Midlands/North West c. £13K + Relocation

This is an excellent opportunity to join a major progressive organisation currently expanding its computer network. The successful candidate will join a small dynamic technical support team and will specialise in DIPS 6 support, although there will be ample opportunity to work with a variety of other hardware/software.

Sound GCOS 6 experience is essential, ideally on a networked environment using T.P.S. In addition to good technical skills, candidates should have a broad appreciation of user needs in a complex environment.

Rewards include:

- High degree of job satisfaction
- Progressive salary based on merit
- Excellent career prospects
- First class conditions of employment
- Relocation package where appropriate

All replies will be treated in strict confidence.

For further details, please contact Barry Turton on (0270) 627206 weekdays, or Alsager (09383) 4743 during evenings and weekends, or write to him at the address below.



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IBM SYS/38

PROGRAMMERS

Cobol or RPG with analysis exp.

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Gloucestershire

We are an insurance company with a difference. As a young and dynamic group, we are market leaders in providing a specialist service to students, graduates and young professionals. Since conception we have been at the forefront of developing a range of innovative business systems and insurance products.

With our current expansion and development plans we now need to expand our computer services team. The ideal candidates will be self motivated and must be able to follow projects through from feasibility to implementation. In addition to normal applications you will be totally involved in our full range of diverse and sophisticated business systems. The nature of the department means you will have every opportunity to increase your technical and analysis experience.

In addition to a negotiable salary benefits include, free pension and life assurance schemes, 25 days holiday and a generous relocation package to move to the Cotswold area.

For further information please call our advising consultant Richard Milsum on 01-354 1055 during office hours or on 01-958 2553 in the evenings or weekends. Alternatively please send full details to him at:

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Ericsson Information Systems is the U.K. subsidiary of the world leading telecommunications manufacturer. Their goal is integrated information systems and office automation for which they already have all the essential components:

Knowledge in the area of telecommunications
Advanced ergonomically designed terminals
Expertise in decentralised mini computer systems
Custom-tailored computer systems
Data communications, data transmission and networking products

To ensure the Company's continued development at their current growth rate of 30% per annum, the following additional software appointments are now to be made:

Senior Systems Advisers

BIRMINGHAM AND LONDON

SALARY PACKAGE - £11K to £14K + Car or Car Allowance

The successful candidates will have a positive approach to both pre and post sales, together with at least 5 years computing experience. You will need to demonstrate experience of:

- Commercial/Business Systems
- Systems Analysis
- Mini Computers
- Project Management
- Telecommunications
- Sales Support

Systems Advisers

BIRMINGHAM AND LONDON

SALARY PACKAGE - £9K to £11K + Car Allowance

To be offered these positions, you will need to have up to 5 years computing experience and will be able to demonstrate a working knowledge of the following:

- Commercial/Business Systems
- Systems Analysis
- Mini Computers
- COBOL programming experience

Senior Programmer/Analysts

BIRMINGHAM AND LONDON

SALARY PACKAGE - £9K to £11K + Car Allowance

These roles will assume the principal technical responsibility within the Group. The following expertise is required:

- A minimum of 2 years COBOL on mini computers
- Real time commercial applications experience
- Experience of structured programming
- Telecommunications

Applications Programmers

BIRMINGHAM AND LONDON

SALARY PACKAGE - £7K to £9K + Car Allowance

The appointed candidates will work as part of the Customer Services Team with a high level of user contact in tailoring standard application packages and the provision of technical support. The required experience is:

- 12 months COBOL on mini computers
- Real time commercial applications experience
- Structured programming

BUT ALL THIS IS NOT ENOUGH - WE NEED A DIALOGUE WITH YOU ON THE SHAPING OF THE SYSTEMS OF THE FUTURE. ERICSSON'S ARE READY WHEN YOU ARE AND THEY ARE WELL AHEAD OF THE FIELD.

For further information and a local interview in either Birmingham or London, please telephone the Advising Consultants on 061-236-1157 during office hours. Evenings and Weekends until 9.00 p.m. telephone Jeff Walton on 061-962-0002 or Roy Torres on 0422-823153.

INTERFACE
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Capable of investigating methods of Network Management and Control; designing and developing a tool that will enable your team to deliver software for a new concept of Network Management.

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Have a good degree and experience in the design and development of REAL TIME COMMUNICATIONS SYSTEMS.

Ideally you . . .

Would have experience in any of the following:

- ★ PACKET SWITCHING
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The project . . .

Is based in The West on client premises, though later some development may be brought in-house (also in West).

The positions . . .

are for both:
TEAM LEADERS AND TEAM MEMBERS

The company . . .

Offer an ideal opportunity for enthusiastic and well qualified professionals to enhance both their own and the company's reputation at home and abroad.

For further information, please contact Jenny Dalrymple-Hay or Ian Murray West on 01-493 2947, from 8am to 10pm Monday to Friday or weekends Ian Murray West on Milton Keynes (0908) 563415 quoting Ref. 6002.

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Text 100 is a young, rapidly expanding PR consultancy with a client list that includes a number of the most interesting companies in the UK microcomputer industry.

Text 100 currently requires a further technical writer with a general understanding of microcomputers to train in all aspects of press and public relations.

Interested? You'll need to be between 23 and 30 years of age, and have a lively and creative writing style and a genuine interest in microcomputers. More importantly still, you will need a forceful, outgoing personality and the willpower to succeed among some of the youngest and most professional people in the industry. As you would expect, this outstanding career opportunity carries a very attractive salary (according to your experience), possibly plus car. Still interested? Reply with full CV to:

Tom Lewis
Managing Director
Text 100 Ltd
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COMPUTER PERSONNEL Saudi Arabia

The following grades are required to work through an associate company in Saudi Arabia. Candidates should be well educated and our minimum age requirement is 25 years.

Systems Analysts £25,000 Tax Free

Must have extensive PL/1 and Fortran linked with IBM environment. TSO MVS VM SAS and SPX knowledge essential. Good communication skills and documentation writing as well as some training experience advantageous.

Supervisors - TP Services/ TP Equipment Analysts £25,000 Tax Free

Experience with large IBM Systems and MVS/JES 2, 3, 3/TSO, VTAM, graphics and output on to Calcomp or Benson plotters as well as 3800 series printers.

We offer bachelor status contracts annually renewable, full accommodation and transport, paid leave to UK and medical insurance. Please telephone and request an application form and further details.

SURVEY & DEVELOPMENT SERVICES
1 Atholl Place, Edinburgh. Tel: 031-228 1446

City of Salford

DATA PROCESSING COMPUTING CONTROL ASSISTANT

(Scale 8/802) £8,154-10,539
COMPUTER CENTRE - SWINTON
Post Ref: 3013/CW

The Computing Control Section assists the Computer Operations Manager by the design and specification of computer operations procedures, including, new and revised applications running on the City Council's computer which the principal machine is, at present, an ICL 2960 running under ICL/2960. Major development of new applications, based on ICL/2960 and TP & MAC. Existing work embraces ICL 1900 batch and 2900 batch, TP & MAC. The responsibilities include data security, scheduling work, recording and monitoring machine use, media selection and the provision of an efficient computing service to City Council departments from an efficient and reliable computer, operating software and computer-based equipment. The successful applicant will possess practical experience and knowledge of the operational aspects of the provision of a computing service. Starting salary will depend on qualifications and experience. Application forms may be obtained from the Personnel Manager, 1st Floor, Civic Centre, Swinton, Manchester M27 2BN. Telephone 061-275 1111. Please quote the appropriate post reference in all communications. Only date for applications: October 7, 1983.

MANNS

A regional operating company of Watney Mann and Trustee Brewers Limited require a

DATA PROCESSING OPERATIONS MANAGER

to be based in Northampton

Responsibilities will include the efficient and economical management of the department along with the provision of a comprehensive data processing service to the company using three Data General mini computers with communications links to an IBM mainframe computer. If you have experience in this field, are educated to a high level and are aged between 25 and 45 then we would like to hear from you.

The salary and benefits are as you would associate with a major company and applications should be made to: Mr C. G. Pollard, Manns Northampton Brewery Company Limited, PO Box 22, Lodge Way, Harlestone Road, Northampton NN5 7UU, stating relevant experience and current salary.

Join our action force

We're Palitoy, the UK's leading toy manufacturers, makers of such famous names as Star Wars, Action Man - and Action Force, of course. Our own Action Force of dedicated DP professionals is expanding to cope with a major development programme on interactive systems based on IBM 38 - and we're currently looking for additional troops (male or female) to join us.

Operations Manager

We now require an Operations Manager, with proven managerial ability to lead a team of 12. Educated to 'A' level standard preferably with a working knowledge of IBM System 34/38.

O and M Analyst

To analyse and appraise our existing systems to ensure that users are adequately trained and that procedures are followed. In addition, the person appointed will assist in the design of new interactive systems and be responsible for ensuring all documentation is accurately maintained during this period of intensive systems development. A background in DP work and considerable O and M experience as applied to computer systems is essential.

Analyst/ Programmer RPG II/III

To develop interactive systems on our IBM System 38.

We require a minimum of 6 months' GSD experience, combined with analyst/programming experience, using RPG II/III.

In addition, a knowledge of COBOL and BASIC would be an advantage. Good communicative skills are essential to liaise between user and development staff. As a successful and progressive company we can offer competitive salaries together with attractive employment conditions and relocation where appropriate. Interested? Think you can handle the challenge? Then write or telephone for an application form to:

The Personnel Department, Palitoy Company, Owen Street, Coalville, Leicestershire. Tel: Coalville 36388.

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Product Development Specialists

£12-16,000 p.a.

U.S.A. Training

Our client is a world leader in data communications, using innovative technology to produce sophisticated, high quality networking products and systems.

Following commitment from their USA parent to large-scale expansion in the UK and Europe, they are currently forming a new design group who will conduct a variety of development projects specifically for the European market.

Of primary interest in this inaugural phase are design engineers, with experience in relevant areas, including communications software and hardware, operating systems and terminals.

In addition to the outstanding prospects related to their extensive growth, the company offers an excellent salary and benefits package. Initial product experience will be gained at their Florida-based facility for a period of approximately six months.

For further details of this exciting opportunity, please telephone Ken Allwright on (0628) 74274 or write to him at Charvil Lewis International, 27 Marlow Road, Maidenhead, Berkshire.

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NORTH WEST

IBM COBOL CICS DL/1 ANALYST/PROGRAMMERS

SOFTWARE AND CONSULTANCY SERVICES

As part of our planned expansion in 1983/84 an outstanding opportunity exists for Analyst/Programmers with good COBOL CICS and DL/1 experience to join our Northern Regional Systems Team.

P-E Computer Services is a leading international software house and consultancy. Since 1959 we have provided a comprehensive service in the areas of consultancy, training services, systems development and support.

Company benefits include an attractive salary, company car, generous expense allowances, non-contributory pension scheme plus the security of working for a long-established, well-managed professional organisation.

If you feel you could respond to the challenge of working in this dynamic environment you are invited to take your career a step further by telephoning or writing to Peter Moore, Regional Manager, at the address below.

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Winchester House, Fountain Street, Manchester M2 2EF. Tel: 061-228 2776

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Micro & Mini Package Development

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Essex

c £12,500 + Car

We have been retained by a computer company which is part of a large transport group.

This company is developing a fully integrated computer package which services haulage companies throughout the United Kingdom. It has been developed on micros and there are now plans to convert this system on to minis.

This is an excellent opportunity to join this young company and develop with it as it grows. It is anticipated that a move into management will follow shortly.

The skills required are strong micro knowledge from both the technical and user aspects (Sirius, Apple etc.), knowledge of transport operations particularly desirable but not essential. Working with minimal supervision, you will need to be a self starter, possessing the skills to get things done quickly and efficiently. Technical support will be an important part of the position which could involve UK travel from time to time. A flexible attitude to work is essential.

For additional details please phone Sue Ashby on 0784 59247 or at home on 0844 53531 (evenings & weekends).

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